Smithsonian

December 1994

MASKS: They're found in every culture; here, a Roman bronze from 2d century A.D. (p. 94)

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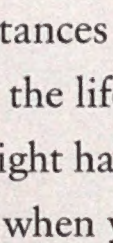

TRANSAMERICA

Life Insurance • Investments • Lending • Leasing

December 1994

Smithsonian

Volume 25, Number 9

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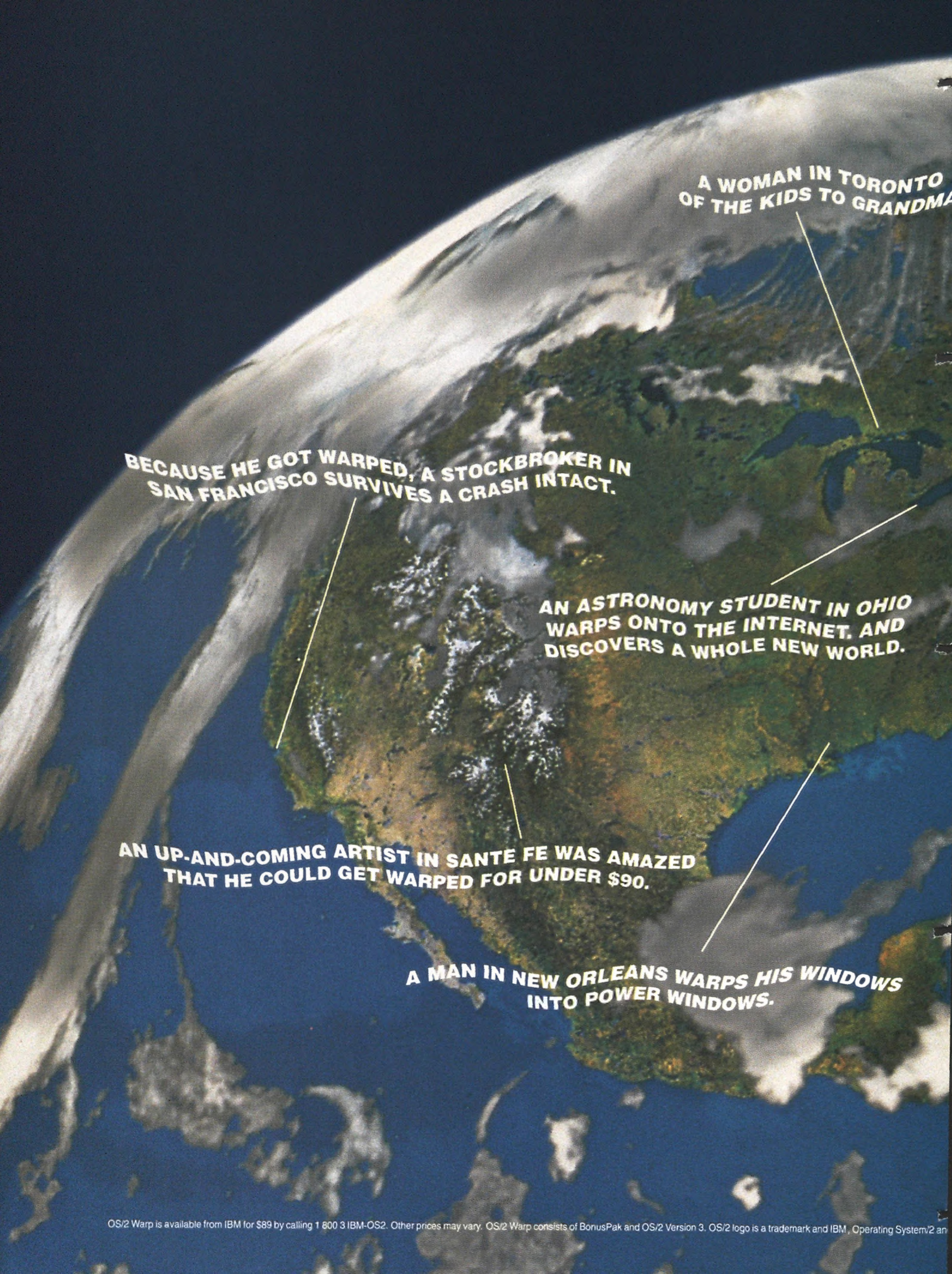
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OF THE KIDS TO GRANDMA
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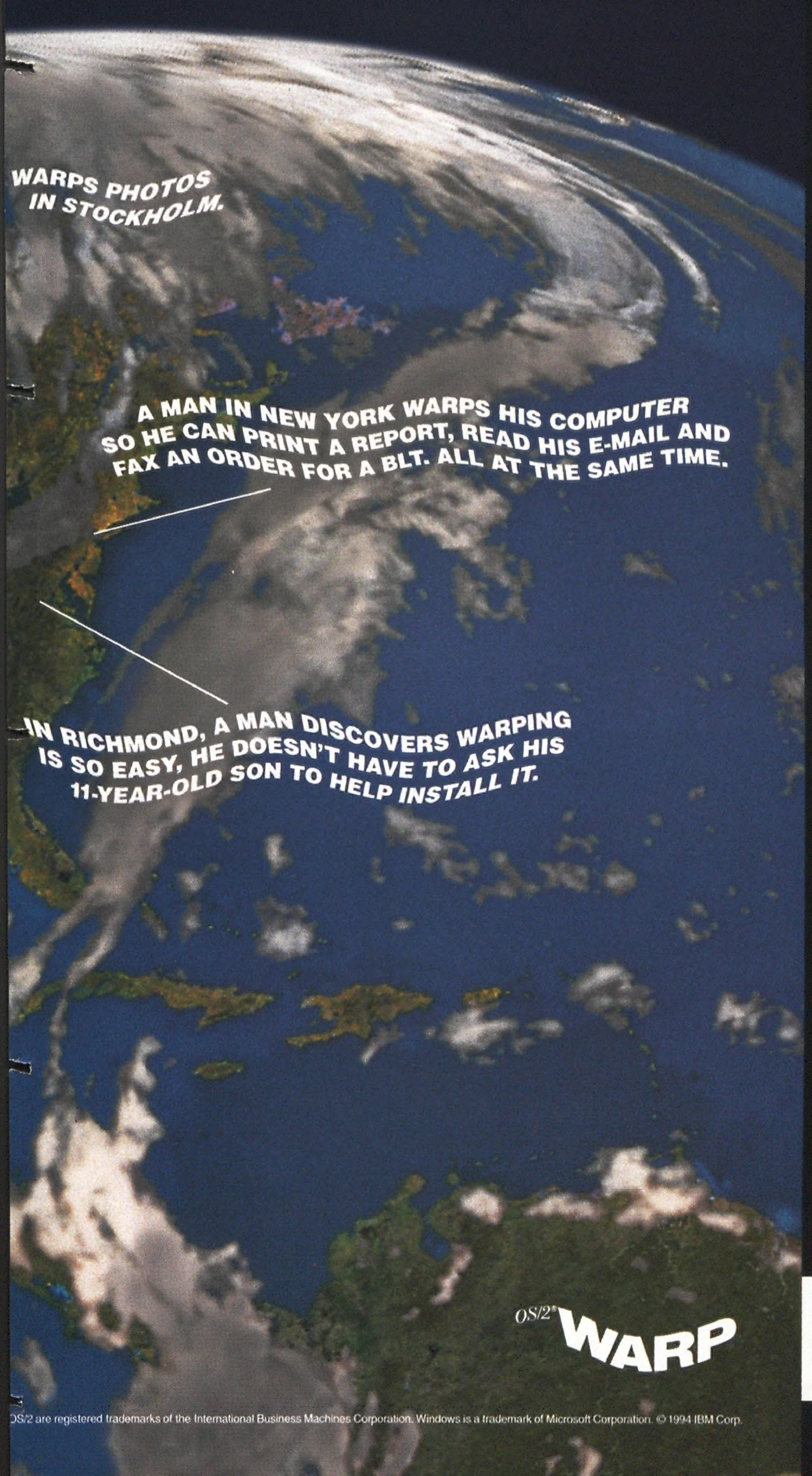
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Secretary Heyman's comments

Smithsonian Perspectives

The National Museum of the American Indian confronts the challenges of private fundraising in a new era

George Gustav Heye, a New York banker, during the years 1903-1954 amassed the most significant collection of art and artifacts of the Native peoples of North, Central and South America in the world. The custodian of the collection, the Heye Foundation, and its Museum of the American Indian in New York City, fell on hard financial times in the 1970s. After a long search for a new home for the collection, Congress created the National Museum of the American Indian at the Smithsonian in 1989. The first of three branches, in the refurbished U.S. Custom House at the southern tip of Manhattan, opened recently. Next to come will be a conservation and research facility in Maryland, where most of the Heye collection will be moved. The third part—a freestanding museum on the Mall next to the National Air and Space Museum, which is expected to open in 2001—will complete the Smithsonian's National Museum of the American Indian.

This new museum, by straightforwardly dealing with the opportunities and problems of private fundraising, interpretive exhibits and access to its collections by electronic means, is confronting the major challenges facing all of the Smithsonian in this era. I explore the fundraising challenge in this column. In succeeding months, I plan to examine how the museum is dealing with interpretation and access, topics that are of wide applicability throughout the Institution.

The Heye collection is exceedingly valuable. If it were sold piecemeal it would net many millions of dollars. On the other hand, building and maintaining facilities to house it, and covering the salaries of those who manage, guard and care for it, are costly indeed. The costs of refurbishing the Smithsonian's space in the U.S. Custom House were met by equal shares from the State and City of New York and the U.S. Government. Some $40 million in federal money will be allocated for the Maryland facility. The Mall museum will cost more than $110 million. Congress has authorized two-thirds of this; the Smithsonian is obligated to raise privately more than $37 million. In addition, we will raise $23 million for an endowment.

This is a substantial challenge for an institution that rarely has been engaged in large-scale fundraising. We, of course, have received wonderful gifts in the past. But the Smithsonian has not until recently been organized to solicit them; rather, we have engaged in much more modest annual fundraising from the Smithsonian's loyal Contributing Membership. That annual fund is critical to meeting operational needs, and we must find ways to enlarge it if we are to cope with our eroding annual federal appropriation.

The fundraising campaign for the National Museum of the American Indian has so far been graced with success. A very large gift of $10 million from the Mashantucket Pequot Tribe of Connecticut has brought the total contributions to $31 million, of which $27 million is dedicated to construction and the balance to items such as program-related support and endowment. In addition, the museum has more than 70,000 members, many of whom make substantial annual gifts.

Central to the museum's success have been its volunteers. The Board of Trustees is involved with long-term governance and is critical to establishing the museum's credibility. This credibility with American Indian tribes underlies gifts such as that from the Mashantucket Pequots. The volunteers who form the International Founders Council provide national leadership to the campaign and have worked indefatigably to raise substantial resources. Another remarkable cadre of volunteers in New York is largely responsible for the gala at the Heye Center opening, which netted nearly $1.2 million.

The entire Institution works hard at obtaining private support. Considerable funds come already earmarked for research projects and exhibitions. For example, the American Chemical Society contributed more than $5 million to enable the National Museum of American History to construct "Science in American Life," and the gift of $5 million from Mrs. Janet Annenberg Hooker assures the renovation of the Geology, Gems and Minerals Hall in the National Museum of Natural History.

To warrant continued success in attracting private resources, the Smithsonian bears a huge responsibility to the donor community. We are carefully identifying those needs that are best met through private resources and will use contemporary, yet appropriate, techniques to secure such funds. The national campaign for the new museum is an effective laboratory for testing ways of integrating fundraising, special events, communications and membership development. We have already learned a great deal that will help us in the future.

Yet, much remains to be done. The Institution's budget for essential operating costs is estimated to be $354.9 million this year. It will receive $313.9 million in federal funding. The balance must come from other sources. We estimate that the combined income from endowment, SMITHSONIAN magazine, museum shops, catalog sales and other sources will be $33.4 million. This includes $9 million from the Contributing Membership. The shortfall of $7.6 million must be covered by contributions of unrestricted funds or by cost reductions. This is a tall order and requires sustained efforts by the whole Smithsonian family.

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Letters to the Editor

The Heye Center

Dear Sir: My first look at your October cover gave me a glimpse of a katsina doll that I have not seen in years. I grew up in the San Diego area, with its reverence for culture, particularly American and American Indian. We went on countless field trips to missions and, on occasion, local archaeological digs. I was fascinated with American Indian culture, especially that of the Hopi.

I remember the excitement I felt on such outings. Recently, I witnessed it in someone else. In San Francisco visiting my family, we went to the De Young museum in Golden Gate Park. Having had my fill of Tiffany lamps, I wandered into cultural display areas that were loaded with children running and giggling and staring in awe.

I felt a tug at my hand and found myself looking at a very young African-American girl. She couldn't have been more than 7 or 8. She pulled my hand, begging me to follow her. We entered an African display. "Look," she said. "It's the dress an African queen wore."

She stood there, so proud of a direct link to her past, one she could see, touch and know was real. Part of her heritage was right in front of her, and she had to share it with somebody, even a stranger.

Your new Heye Center is history, not merely a tale to be told but something to be seen and felt. I hope it can bring the same excitement to others that I have felt myself so many times.

J. Carlos Salazar
Fresno, California

Fenway Park

Dear Sir: During the 1967 World Series, my wife had purchased tickets for a concert at Symphony Hall. The date coincided with one of the later games. I grudgingly agreed to attend, but tucked a transistor radio in my suit coat pocket. Early in the concert the earpiece fell from my ear, spilling loud Fenway crowd noises over our immediate area, drawing glances and smiles from those sitting nearby. When they began silently mouthing at me, "What's the score?" I answered with finger signs. Several times during breaks in the music I passed along a great Red Sox play in a stage whisper, which spread rapidly and provoked a bit of discreet shoulder slapping. Once I clearly heard a sotto voce "Go, Sox!" from a distinctly black-tie area. After the concert the score was announced over the PA system. Best of all, our Sox won.

Doug Swank
Waltham, Massachusetts

Dear Sir: Fenway-worship is a classic example of "good old days" mentality. The only reason it seems to be the perfect ballpark is because it's so old. I have attended more than one game at Fenway, and in my opinion it is the ugliest park ever constructed. Watching a game there is like sitting at the bottom of a well. It is entirely too small—both for the fans and the players—and the acoustics are horrible. And what's worse, it doesn't have any peanut vendors (at least not when I've been there).

Thomas W. Overton
Los Angeles

Storm chasers

Dear Sir: It's a pity that Mr. Wolkomir didn't bother to sample the spectrum of amateur storm chasers beyond a single example. And by focusing on the polarity between scientists and amateur chasers, he has done us both a disservice. I worry about public support for science. Your readers deserved an article that offered some insight into the science of meteorology. This article only serves to deepen my concerns.

Dr. Charles A. Doswell III
National Oceanic and Atmospheric Administration
Norman, Oklahoma

Motown

Dear Sir: No telling of the Motown story is complete without mentioning the one individual who had more to do with creating the "Motown Sound" than anyone else—James Jamerson, the bass player in Motown's in-house band, the Funk Brothers. Not only did Jamerson play bass on the vast majority of the records of Motown's heyday, he wrote many of the bass lines, often so catchy they became the "hooks" that made songs hits. His playing made dancing to Motown records irresistible.

Moreover, his virtuosity on the then new electric bass guitar was a seminal influence in the general shift in bass playing in 1960s popular music from the upright string bass to the electric, and the rise in importance of bass instruments in modern music.

Today, Jamerson's playing is revered by many bassists. Unfortunately, during his life he never got the recognition he was due. He died in 1983 in Los Angeles at 47, a discarded, depressed and forgotten alcoholic.

James B. Stevens
Oak Park, Illinois

Presidential photographs

Dear Sir: On page 100 you say that Franklin D. Roosevelt was always photographed from the waist up. There are numerous photos of FDR "walking." He wore locked steel braces that allowed him to swing his legs from the hip, while holding the arms of strong men on either side, often his sons.

Lowell K. Dyson
Alexandria, Virginia

Lonely Planet

Dear Sir: As residents of Kunming from March 1992 to June 1993, my fellow expatriates and I relied heavily on Lonely Planet's *China*, commonly referred to as "the bible" among travelers.

Maureen Wheeler's remark about the patronizing nature of complaints that their publications ruin pristine locales rang exceptionally true. Some travelers and travel books seem to feel cultures should stay poor and undeveloped just for their enjoyment. Bashing the influence of Western culture is easy when one returns to electricity, indoor plumbing, modern health care and literacy.

Alysha Webb
Seattle, Washington

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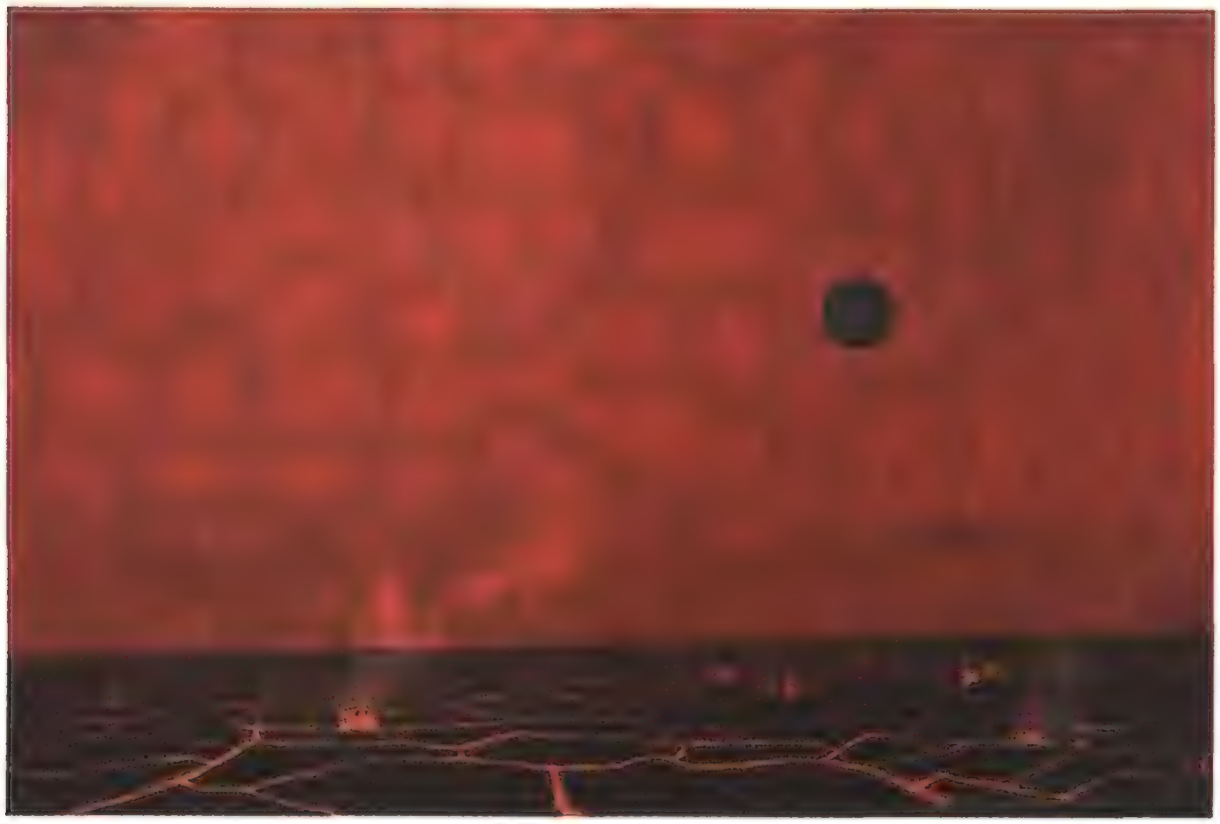
Phenomena, Comment and Notes

What shall it profit a person to know that in just six billion years, the Sun will expand into a red giant, bringing a fiery end to the cool green hills of Earth?



Hellfire of the future Sun, with the melting Moon crossing in front of it, fills the sky over Earth. Floes of cooler material float on the slag of what were once continents.

Pure, or basic, research, in the jargon of science, is work so fundamental that no one can yet see how the results might have any practical value. It is not directed at a utilitarian goal but is, rather, human curiosity unchained.

Within living memory, physics could still be done on a tabletop. Private donors could be found to pay for astronomical telescopes. We have pushed the frontier of knowledge so far that now only "big" (read multimillion-dollar) science can answer the next set of questions. And sometimes society decides, as with the recent demise of the Superconducting Super Collider, that it does not want to pay that much.

Oftentimes pure research produces results that change our lives (recall that electricity was once only a laboratory curiosity). No one can be sure which lines of pure research will pay off in the future. But can we not take pride in all achievements of the human mind?

Consider the star that gives us life: the Sun. For most human beings, stars—including the Sun—are eternal and unchanging. "Bright star, would I were steadfast as thou art," sang the poet Keats. For astronomers, however, stars are not eternal at all. They are little more than temporary phenomena in a universe on its way from the Big Bang either to dissolution in the cold, eternal void or back to oblivion in the Big Crunch. Stars are born, live out their lives and die like everything else.

In the grand scheme of things, the Sun is a relative newcomer: if the life of the Universe thus far were a single year, the Sun would not have been born until about Labor Day. And it would die sometime around the following May Day. An international group of researchers recently published several years of work on the life history of the Sun, from its birth billions of years ago to its death billions of years in the future.

About 4.5 billion years ago, a cloud of dust and gas in deep space started to contract under the pull of gravity. In a mere 50 million years (little more than half a day in the "Universe's year"), the cloud had become so dense and the pressures so great that temperatures at the center exceeded 21 million degrees F. Nuclear fusion began. The energy released worked its way out through the still-condensing cloud of gas, exerting a pressure that stopped the inexorable collapse. The cloud stabilized as the energy radiated out into space. The outgoing light signaled that a new star—the Sun—had been born.

During the more than four billion years since then, the Sun has been burning hydrogen at the rate of more than three million tons per second. It has gradually brightened: today it is some 30 percent brighter than it was when its nuclear fires first ignited. In the language of astronomers, the Sun, like most other stars, is in the "main sequence" phase of its life.

The past, while interesting, is not nearly as interesting as the future, however. Here's what the research team—I.-Juliana Sackmann from the California Institute of Technology, Arnold I. Boothroyd from the University of Toronto and Kathleen E. Kraemer from Boston University—tells us lies in store. For the next few billion years, it will be business as usual. The Sun will continue to burn hydrogen and continue to slowly brighten. About 3.5 billion years from now, a milestone will be reached that, while meaningless for the Sun, is not without interest for us. It is at this point that the still-brightening Sun will become so hot that Earth's oceans will boil away, producing the ultimate environmental catastrophe.

The Sun, oblivious to the effects it is having on its planets, will plod along, gradually brightening all the while, for another 3 billion years. Then, having spent 11 billion years as a sedate main-sequence star, it will have used up its hydrogen and will start its finale in a blaze of pyrotechnics.

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Without the outward pressure of radiation from hydrogen burning, the Sun will begin to collapse again until temperatures in the core are high enough for helium—the element that all those hydrogen atoms have been fused into—to ignite in what astronomers call the helium flash. Further exotic processes with names like "first dredge up" will drive changes in the Sun to make it unrecognizable to anyone left on Earth, if anyone could be left on Earth.

The Sun will begin to swell, while at the same time spewing great quantities of its substance into space. In the first episode of swelling, the Sun will swallow the planet Mercury and its outer rim will reach beyond the present orbit of Venus. Our sister planet will no longer be there, however, because as the Sun has lost mass, its gravitational pull on Venus (and Earth) has become less, and these planets have moved away from the encroaching fires. The Sun shrinks and then swells again. It loses more mass, and once again all the surviving planets dance farther away. At its largest extent, the outer edge of the Sun reaches almost to the present orbit of Earth.

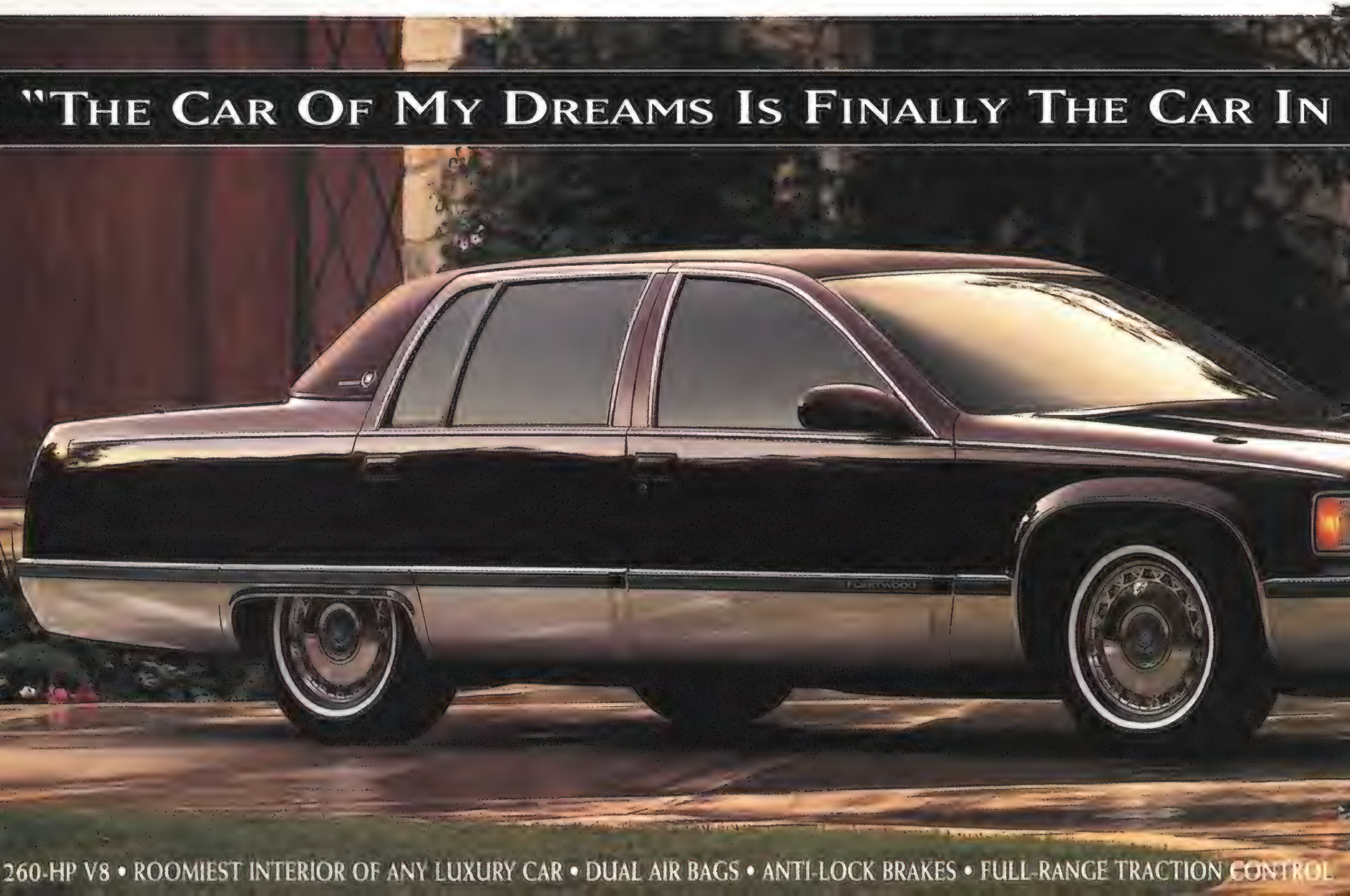
When the fireworks are over, the Sun shrinks down to about 6 percent of its former diameter. Now it is a white dwarf. Our planet, meanwhile, has moved out to about the present orbit of Mars, and the Solar System settles down to a long, slow process of extinction. The heat stored in the Sun gradually radiates out into space. Finally comes a day when the appearance of the Sun above our horizon no longer brings light with it. Earth will have seen its last sunrise.

This is a compelling story, the stuff of epics. For me, at any rate, it produces the same feeling of joy, the same uplifting of the soul, that I get from experiencing a great work of art. Maybe you share that feeling.

But the story of how modern scientists have solved yet another ancient puzzle carries within it the seeds of deeper questions. In the cold fiscal climate of the 1990s, it is not enough to marvel at the results of a scientific investigation. You also have to ask how you can justify supporting this kind of work when (fill in your favorite social or environmental problem here) still exists in the world. Isn't working out the life story of the Sun a prime example of diverting brainpower into areas with no payoff?

The party line among scientists who have to justify spending money on research is that even research that seems to be totally useless often turns out to have enormous practical import. Take your mail, for example. When you send a letter, you put a ZIP Code on the envelope. You may type it, print it neatly or, if you're like me, put it down in a hurried scrawl. Machines now being tested by the Postal Service can read that ZIP Code no matter how neatly or sloppily it is written. Those machines (and many of their cousins in what is called "pattern recognition") came out of research in the 1950s and '60s when physicists were trying to make it possible for computers to recognize the interactions of subatomic particles. The goal was to work out the interactions of the basic constituents of matter, a quest that eventually led us to today's quarks and unified field theories. (Can you think of anything more useless?)

The basic tool was called a bubble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chamber; subatomic particles would leave tracks in the form of lines of tiny bubbles as they were created in nuclear maelstroms. Physicists accumulated huge numbers of photographs of these tracks, each of which had to be scanned by a human being. In any big laboratory you could find darkened rooms full of people scrolling through reels of film, looking for patterns in those tracks. The motivation to develop computer systems to take over this task was obvious, and many physicists worked very hard to do just that. To them, it was a tool that would allow them to get answers to their abstract questions more quickly. But when they built the machines they wanted, they found approaches that could help in any endeavor that involved the repeated recognition of standard patterns, whether it required the automatic counting of replicating generations of cells or the recognition of ZIP Codes.

Here's another example. If you have ever gone to a hospital for magnetic resonance imaging, you have had firsthand experience with another payoff. Part of the apparatus is a special kind of magnet, made of superconducting wire (the wire offers no resistance at all to electric current). The techniques that made it possible to produce such a magnet were developed at the Fermi National Accelerator Laboratory in Batavia, Illinois, by people building a machine to study the basic constituents of matter.

When you do basic research, therefore, once in a while you hit something that pays off big, big enough to justify the money spent on the stuff that does not pay off. And because you can never tell what will pay off and what won't (the party-liners argue), you should support as much research as you can—even studies of the last days of the Sun.

I think this argument is valid, but in my heart of hearts I know that my making it to you is not quite leveling with you. For me, the real reason why this sort of work ought to be done is only tangentially related to possible economic payoff. There are times, late at night, when I think about this question in much larger (and fuzzier) terms. In those moments, I often pose the question: What will the history books say about 20th-century America five centuries from now?

When you look at things this way, a lot of what looms large to us now does not seem so important. No one, for example, will care how fast we delivered the mail. Furthermore, I suspect that five centuries from now people will assign about as much importance to World Wars I and II as we do to the War of the Spanish Succession, and the Vietnam and Persian Gulf conflicts will not even rate footnotes. What will matter will be the enduring contributions that we will have made to the human race: our art, our literature, our thoughts.

A large part of our monument will be our science and technology. We will be remembered as the people who first walked on the Moon, who figured out how DNA works and, yes, who even understood what the last sunrise will look like billions of years from now.

When you come right down to it, there are lots of worse things to be remembered for.

James Trefil
Robinson Professor of Physics
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The Object at Hand

An official group portrait from 1868 commemorates a treaty between the U.S. Government and the Utes, ceding to them a considerable part of Colorado—which was theirs anyway

The object at hand is a photograph. It hangs in the Smithsonian's National Portrait Gallery, and it was taken in February 1868 at Mathew Brady's photography gallery on Pennsylvania Avenue in Washington, D.C.

Nine of the pictured men represented the U.S. Government. Eight were chiefs of the Ute tribe, who had come to town to negotiate a hopeful and historic treaty between the Colorado Utes and the United States. The man who, more than any other, was responsible for the treaty on the Utes' side was a controversial chief named Ouray. Fourth from the right, clad in a beaded buckskin shirt and trousers, his thumbs tucked firmly in his waistband, Ouray looks very much a leader. At age 35, he was soon to retain from the government 15 million acres, roughly a third of what was then the Colorado Territory.

That came to roughly 4,500 acres for each Ute man, woman and child—an uncommonly large expanse in those days of reservation making. As Ouray understood it, the treaty terms were to endure "as long as grass grows and water runs." Predictably, the treaty did not last that long. All the land, and even more, had previously belonged to the Utes without need of government agreement or approval. Given the westward course of Thomas Jefferson's coast-to-coast "Empire of Democracy," tragedy inevitably followed.

No one knows for sure the origin of the stocky-framed nomadic Utes. For more than a thousand years they and their forebears occupied most of what is now Colorado, the eastern half of Utah, and northern New Mexico—some of the most beautiful landscape on the continent. They were hunter-gatherers whose god was the Sun. They regarded Earth as a living creature; to till the soil was to them sacrilege.

In the 17th century, Spanish conquistadors coming up from Mexico brought changes and challenge. Also horses. By the start of the 19th century the Utes in Colorado had grouped themselves into a loose confederation made up of seven tribal bands. Ute children sometimes went to Spanish settlement schools at Taos and Santa Fe.

Born near Taos about 1833, Ouray was one of these. His mother was from the Uncompahgre band; she married a Jicarilla Apache who had been adopted into her tribe. After her death, Ouray's father remarried and joined the Uncompahgres in Colorado, leaving Ouray with a Spanish family; he was schooled by Catholic friars. In 1846, when the U.S. Army swept through the region on its way to the Mexican War, he was impressed by its size and strength. The experience doubtless encouraged his later determination to keep peace between Indians and whites.

At age 17, Ouray quit Taos for Colorado to join his father. He soon distinguished himself as a warrior, hunter and tactician. At about the age of 27 he became a subchief of the Uncompahgre. His knowledge of Spanish and English made him valuable to Indian agents who served the government in Washington, and in 1861 he was given a yearly salary of $500—as interpreter and negotiator. He also became a good friend of Indian agent Kit Carson. In 1859 gold was discovered in Colorado, and Carson and Ouray knew that Ute country would soon be overrun by white men. They decided that the Utes should seek a treaty to define and protect Ute territory before it was too late.

By 1868, when the Ute delegation set off with Carson to the nation's capital to discuss a treaty, it was Ouray whom President Andrew Johnson (and not the Utes) appointed as the official leader of the Ute tribe. Many Utes were infuriated by his appointment. He was regarded as a friend to Indian and white alike, but whenever he worked for Washington, he got a stipend, so re-

Most prominent negotiator for the Utes was Ouray (fourth from right), a famous chief of the Uncompahgre band. Alexander Hunt (tenth from right) was governor of the Colorado Territory.

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The Wonder of Iron-2

An iron kettle is always used for boiling water in the traditional Japanese tea ceremony. Iron is an ideal agent for purifying the water.

Cooking with Iron

By Tomomi Kono

Although many cooking utensils are made of iron, iron kettles and pans most actively promote flavor. An iron tea kettle is always used when preparing tea for the Japanese tea ceremony; indeed, it has long been accepted that it is nearly impossible to make good quality hot water for tea without using an iron kettle.

Water boiled in an iron receptacle is ideal for making tea, as traces of the metal dissolve in the water and agglutinate with organic compounds, leaving hot water that is very nearly pure. More precisely, the water is partly ionized and subjected to a magnetic-like force. The minute amounts of metal dissolved in the water are drawn together, agglutinate with the organic compounds, then precipitate out and adhere to the iron receptacle. The resulting pure water helps create tea with an extremely fine flavor. A danger exists, however, that if the metal used for the receptacle is not of a very high purity, the color of the tea could be altered, or its flavor impaired.

In Japanese cooking, an iron pan is used for preparing beef for sukiyaki. Since heat is distributed evenly throughout such a pan, charring of the meat can easily be prevented. Furthermore, the meat remains tender, as slow and even heating preserves the spiral structures of the proteins in the beef. Similarly, a steel plate made of thick iron is most desirable in cooking meat for teppanyaki.

Iron pans are quite useful for the "clean" preparation of vegetables as well; flavor can be maximized and sticking handily avoided. This is the case even for those vegetables with a high sugar content, such as onions and carrots, that are rather prone to sticking and burning.

An iron pan is good for sautéing when using Chinese cooking methods. Since iron retains a good deal of heat, food can be cooked vigorously for a brief period without becoming inconveniently sticky.

About the Author:
Tomomi Kono specializes in food science, and is a director of The Kono Food Research Institute. He is currently a professor of The Osaka Kun'ei Womens' College, and has more that 160 published works.

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sentment grew along with his fame as a negotiator.

The issue in 1868 for the Utes was setting definite boundaries to their lands and keeping whites from trespassing—as well as guarantees that they would receive enough federal assistance to complete a change of lifestyle. Ouray made clear that U.S. law would have to protect Indians as well as whites, not merely assert that whites could not trespass on Ute land. In return he pledged, rather unrealistically, that the Utes would give up nomadic life and try to live peacefully as farmers and ranchers.

"The agreement an Indian makes to a U.S. treaty," Ouray told bureaucrats at the bargaining table in Washington, "is like the agreement a buffalo makes with his hunter when pierced with arrows. All he can do is lie down and give in." But he didn't give in. As a result, the Utes found themselves guaranteed 15 million acres free of trespass and secured from crime "forever," in addition to an allowance for provisions of up to $60,000 per year for 30 years. Each Ute family was to receive "one gentle American cow and five head of sheep."

As the treaty was being drawn up, Ouray coaxed additional concessions from Washington and promises from the Utes. Indian agents were hired and fired, a schoolhouse was built, as were a few bumpy roads. But many treaty promises were never met. More white settlers began trespassing on Ute lands, too, but for three years, because of Ouray's work, a potentially explosive situation was contained.

When more gold and silver were discovered on Ute lands in the San Juan Mountains, the flow of settlers became a flood. They wanted to know why "a small band of dirty nomads" should hold so much land. "An Indian has no more right to stand in the way of civilization and progress than a wolf or bear," editorialized the *Boulder News*.

Ute tempers flared as well. Ouray became convinced that the only workable way out was to sell off the ore-rich land that whites were clamoring for and try to prosper on the remaining 12 million acres. On September 13, 1873, he finally got the Utes to cede the San Juans to silver-hungry settlers in return for another $25,000.

Meanwhile a handful of Utes who regarded Ouray as a traitor in the pay of the U.S. Government began plotting his murder. He rapidly sought them out and killed most of them for what he saw as acts of treason.

Colorado became a state in 1876. From 1870 to 1880 its white population more than quadrupled, from 39,000 to 194,000—and so did anti-Indian sentiment. Colorado's new governor, Frederick Pitkin, was elected on a Utes-must-go platform. An editorial in the *Denver Tribune* warned Ouray's white admirers back in Washington that out West, Eastern prejudices "in favor of the Indians [must] give way before the strong disgust inspired by closer acquaintance."

Enter now one Nathan Meeker, lately appointed to the White River Agency on the Ute reservation. Meeker, an ex-newspaperman who had founded a co-operative-farming utopia outside Denver, was both unrealistic and pigheaded. He set out on a crash program to turn his part of the Ute reservation into a modern farming community overnight.

As a site for planting, he chose the winter pasture of the Utes' greatly prized horses, doing his best to convince the Indians that they could never be good farmers as long as they had thousands of horses to care for. One fateful day he called in a hot-tempered young Ute subchief named Johnson and told him, "You have too many ponies, you had better shoot some of them." Johnson promptly picked Meeker up and tossed him out of his own office. Meeker was hurt very little, but he instantly fired off a telegraph message to Washington requesting troops. Arrests and dire punishment would be the result, he told the Utes.

Out from Fort Steele in Wyoming, 200 miles away, came Maj. Thomas Thornburgh, along with 178 men and 33 supply wagons. On September 26, 1879, Thornburgh's men were met well north of the reservation by five representatives of the White River band. All was calm on the reservation, they told Thornburgh; no need to come farther. The Utes were afraid that the troops would make good on Meeker's wild threats. But Thornburgh kept coming anyway.

Next came messengers from Meeker saying that all the help he needed was Thornburgh plus five soldiers for "a peace council." The major and his whole force were finally met at the edge of the reservation and warned that if any troops crossed Milk Creek onto Indian land, there would be a fight. Again Thornburgh pressed forward. When he was still miles from Meeker but well in-

side the reservation, a fight broke out, Utes and soldiers firing a barrage of arrows and bullets.

Thornburgh was quickly killed. His surrounded troops could only dig in defensively. During a six-day siege, 13 soldiers and 37 Utes died. At about the same time, 20 Utes surprised Meeker at his agency, killed him and eight other white men and took his wife, two other women and two children hostage.

Ouray was hunting when the news reached him. The whites were to blame, he knew. They had entered the reservation, violating the treaty's "no trespass" clause. But unlike many of his people, he also understood that the killings and abductions would be punished, and that politicians in Denver had been given a perfect excuse to close the reservation and send the Utes away.

Ouray promptly called on the White River Utes to lay down their arms. They complied. After some weeks in hiding, the 20 kidnappers also surrendered when Ouray offered an ultimatum: bring in the hostages, or all the other Ute bands would come and get them.

This was a bold bluff, but the hostages were duly delivered up. At first it seemed that all might yet go well. "We were well treated at Ouray's house," wrote Flora Price, one of the captives. "Mrs. Ouray wept for our hardships."

But the women, including Mrs. Meeker, said they had been raped. On January 16, 1880, Ouray traveled to Washington to testify before Congress. Tired and ailing, he defended the Utes as best he could. Urging that only the Utes who committed the crimes be punished, he noted that Meeker had pushed the Indians too hard, that whites had trespassed on Ute lands and that there had been many occasions when these trespassers had shot at the Utes.

No one was impressed. The whole Ute confederation was forced to pay reparations for the crimes of a guilty few. As the result of a new and punitive agreement, most of the Utes were deprived of their ancestral lands and gradually dispersed to different reservations. In just 22 years Ouray's 1868 treaty had been undone. Dispirited, he went home to Colorado, where he died only two weeks after his return. The following year, the 1,458 men, women and children of the Uncompahgre band packed up their belongings and began the long walk to a reservation in Utah.

Beth Py-Lieberman

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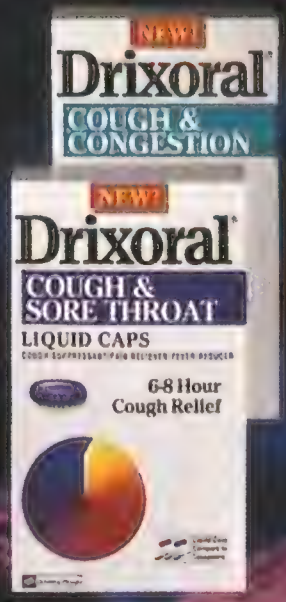

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Smithsonian Highlights

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Museum hours

Most of the Smithsonian museums are open 10 A.M.- 5:30 P.M. daily, except Christmas Day, December 25. Hours at the National Zoo are 9 A.M.- 4:30 P.M. daily for buildings, and 8 A.M.- 6 P.M. daily for grounds.

Holiday events

Traditions of Christmas, Hanukkah, Kwanzaa and the New Year will be observed at the National Museum of American History's annual Holiday Celebration, December 26-31, noon-4 P.M. daily. Festivities will include music, storytelling and special exhibitions.

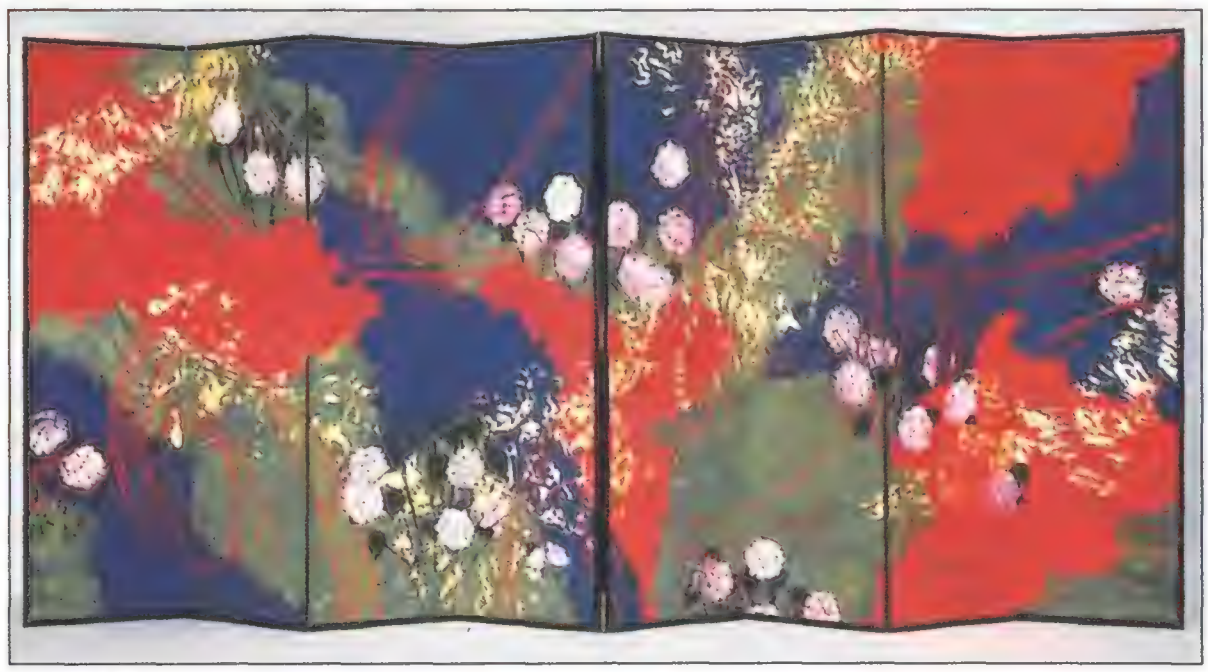
Special December exhibits, events

National Museum of American Art

Works by Jesse Treviño: New York, Vietnam, San Antonio (through January 8, 1995) Paintings and drawings by the San Antonio, Texas, realist. See *Highlights Continued*, page 32.

Free Within Ourselves: African-American Art from the Museum's Collection (through February 26, 1995) Paintings, sculpture, folk art, works on paper, and photographs by nearly 100 artists, including Jacob Lawrence and James VanDerZee.

Man on Fire: Luis Jiménez (through January 2, 1995) Fiberglass sculptures and related graphic works by the contemporary Mexican-American artist.



Artist Allan West used mineral pigments and gold leaf for folding screen *Akanuma* (1991), at NMAA's Renwick Gallery through February 5, 1995.

Renwick Gallery
Contemporary Crafts and The Saxe Collection (through February 5, 1995) Exhibition showcases the studio craft collection of George and Dorothy Saxe of Menlo Park, California.
Allan West Meets East: Four Folding Screens (through Februry 5, 1995) Large-scale works by the American artist living in Japan draw on traditional Japanese landscapes, American Color Field painting and the work of Sam Gilliam.

National Portrait Gallery
Federal Profiles: Saint-Mémin in America, 1793-1814 (December 2-May 29, 1995) Portraits by the French artist include likenesses of Thomas Jefferson, Mother Elizabeth Ann Seton and others.
Points of View: Single Subject/Multiple Artists (through February 20, 1995) Portraits of 16 sitters by more than 50 artists, from Alexander Calder to Andy Warhol, feature subjects from Paul Robeson to Albert Einstein.
Recent Acquisitions (December 9-May 29, 1995) Artworks include photographs of Lucille Ball and Orson Welles by Harry Wannecke, caricatures by Alfred Frueh.

National Air and Space Museum
Aerial Inspirations: Silk Batiks by Mary Edna Fraser (through June 4, 1995) Large-scale silk batiks by this contemporary artist portray her vision of geographic features throughout the United States.
Where Next, Columbus? Permanent show examines the scientific, technological, economic, ethical and political issues involved in future space travel.
Destiny In Space (10:45 A.M., 1 P.M., 3:15 P.M., 5:25 P.M. daily) Imax film looks at human and robotic space exploration.
Titanica (6:15 P.M. daily) New Imax film reveals the discovery of the sunken luxury ocean liner *Titanic.*

National Museum of Natural History
Spiders! (through January 2, 1995) Live and mounted specimens, games, videos, photographs, interactive displays, prose, poetry and spider myths.
Sacred Mountains of the World (through September 5, 1995) Photographic images of mountains that have been inspirational in the quest for the preservation of wilderness.
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From Crystal Gardens (through January 2, 1995) Exhibition of 20 of the most spectacular specimens in the museum's mineral collections.

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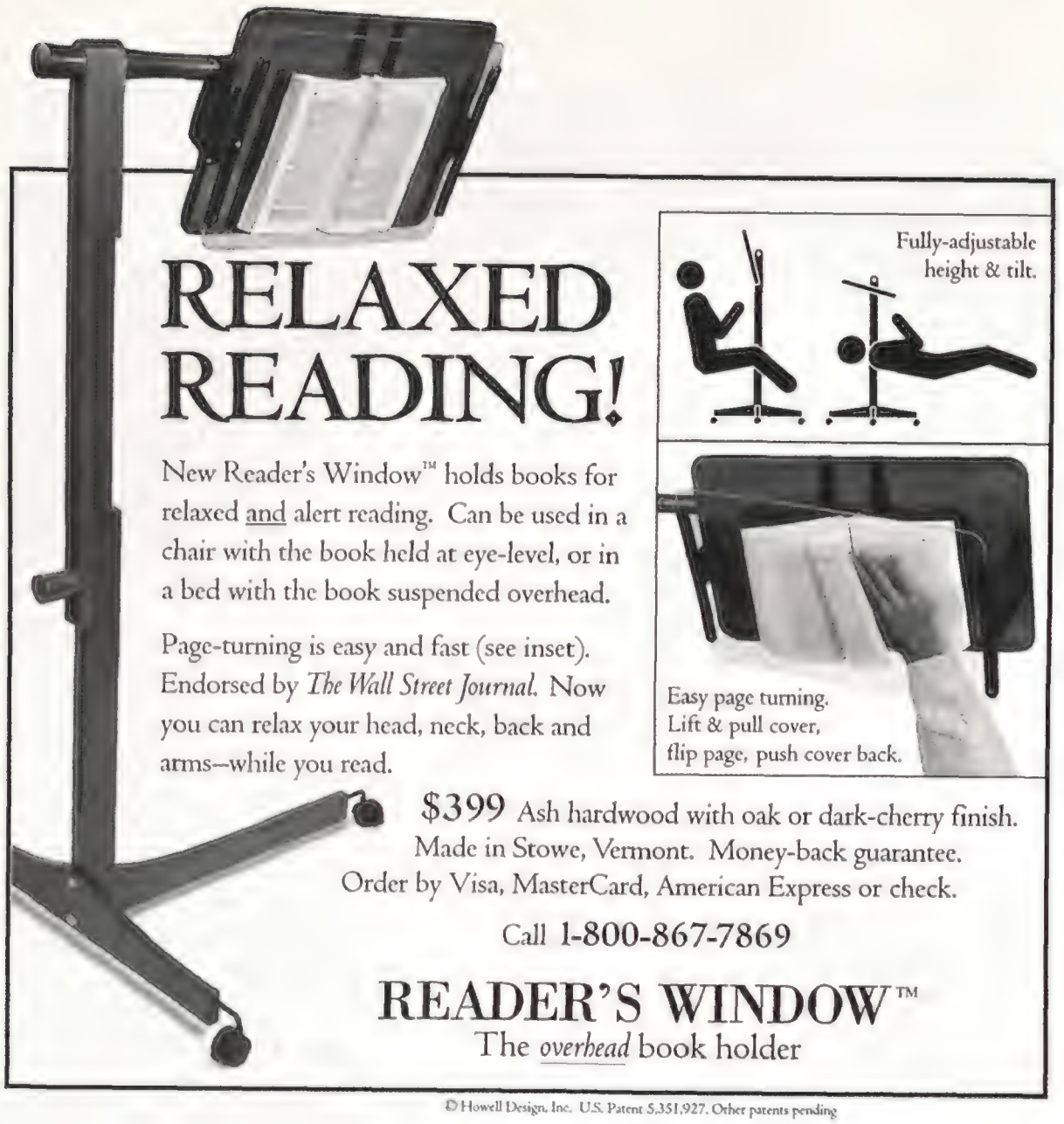
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What's New at the Zoo? An engaging new generation of animals has taken up residence at the Zoo this past year. Look for such additions as Kumari, the elephant calf born last December.
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National Museum of American History
Science in American Life Permanent exhibit tracks advances and discoveries in science over the past 125 years, and features a hands-on science center.
American Encounters Permanent exhibition focuses on the American Indian, Hispanic and Anglo-American cultures of New Mexico's Upper Rio Grande Valley.
Earth Angels: Migrant Children in America (through February 1995) Photographs by Nancy Buirski.
Home Care Becomes A Profession: Public Health Nursing, 1885-1993 (through January 2, 1995) Images document achievements of visiting nurses associations.
Images of Steel (through January 16, 1995) Photographs by Russell Aikens, Lewis Hine, Arthur D'Arazien, Anderson Scott, look at America's steel industry.

National Postal Museum
The Smithsonian's newest museum, located next to Union Station on Capitol Hill, presents exhibitions tracing the history of the nation's mail service.
Best Wishes: Holiday Greetings from the White House (through February 17, 1995) A series of Christmas cards from Presidential families.
Philatelic Rarities (runs indefinitely) Display features original stamp sketches by President Franklin D. Roosevelt.

Freer Gallery of Art
Beyond Paper: Chinese Calligraphy on Objects (through April 21, 1995) Clay, lacquer, metal, jade, bamboo and wood objects date from 7th-19th century.
Masterpieces of Chinese Calligraphy (through February 19, 1995) Works represent all four major scripts and the four primary formats.
Luxury Arts of the Silk Route Empires (runs indefinitely) Adjoining galleries showcase objects from the Freer and Sackler collections.

Arthur M. Sackler Gallery
Paintings from Shiraz (December 24 - August 27, 1995) Bound manuscripts and individual paintings illustrate the arts of the Persian book created in Shiraz during the 14th-16th centuries.

A Basketmaker in Rural Japan (through July 9, 1995) Woven bamboo backpacks, fishing creels, kitchen storage baskets and containers by Japanese basketmaker Hiroshima Kazuo.
Landscape as Culture: Photographs by Lois Conner (through May 30, 1995) Large-format platinum prints by the contemporary photographer record the landscape and architecture of China and South Asia.

National Museum of African Art
Mohammad Omer Khalil, Etchings/Amir I. M. Nour, Sculpture (through February 26, 1995) Works by two contemporary artists from the Sudan.
Grace Kwami Sculpture: An Artist's Book by Atta Kwami (through March 27, 1995) Ghanaian artist's recent "book" explores the artwork of his mother, Grace.
Images of Power and Identity Permanent exhibition features 100 masterworks.

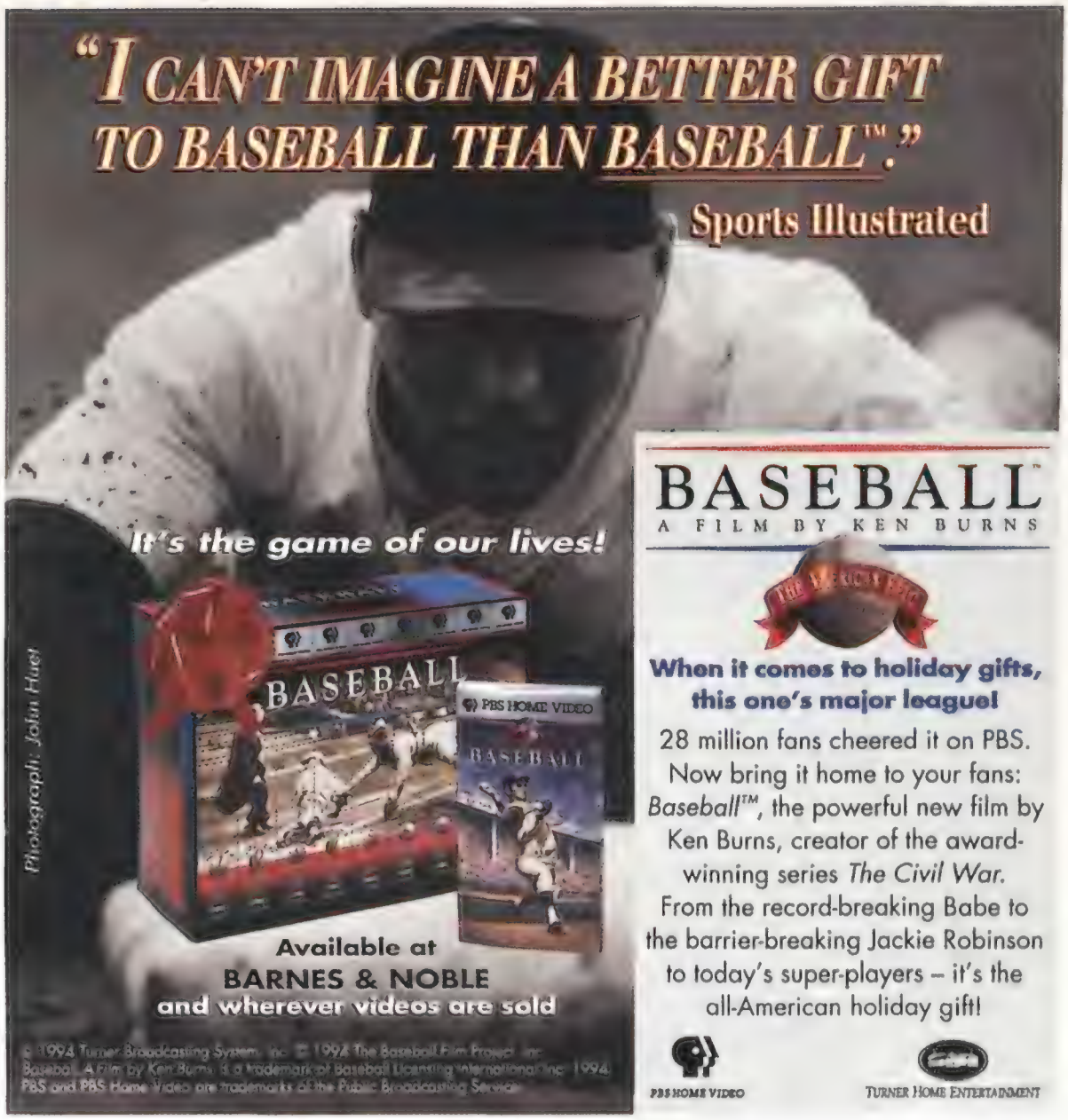
Anacostia Museum
In Search of Common Ground: Senior Citizens and Community Life at Potomac Gardens (December 4-January 15, 1995) Shared experiences of ten black families, migrants from the rural South to Washington, D.C. in the 1930s-'50s.
Black Mosaic: Community, Race and Ethnicity Among Black Immigrants in Washington, D.C. (through August 7, 1995) Oral histories, art, photographs, other materials, reveal cultural diversity.

Hirshhorn Museum & Sculpture Garden
Bruce Nauman (through January 29, 1995) The work of one of the most rigorously experimental American artists of the past 25 years.
Directions—Gary Simmons (through February 12, 1995) First solo museum show of the New York-based African-American artist includes 1993 series "Erasures."

Arts and Industries Building
Imagining Families: Images and Voices (through February 28, 1995) Inaugural exhibit of the National African American Museum Project presents the work of 15 American photobiographer-artists.
Discovery Theater
Hansel and Gretel (through December 31) Performances: Tuesday-Friday, 10 and 11:30 A.M.; Saturday, 11:30 A.M. and 1 P.M. For reservations call (202) 357-1500 (voice or TTY).

S. Dillon Ripley Center, International Gallery
Wenceslaus Hollar: Seventeenth-Century Prints from the Museum Boymans-Van Beuningen, Rotterdam (through January 23,

Continues on page 30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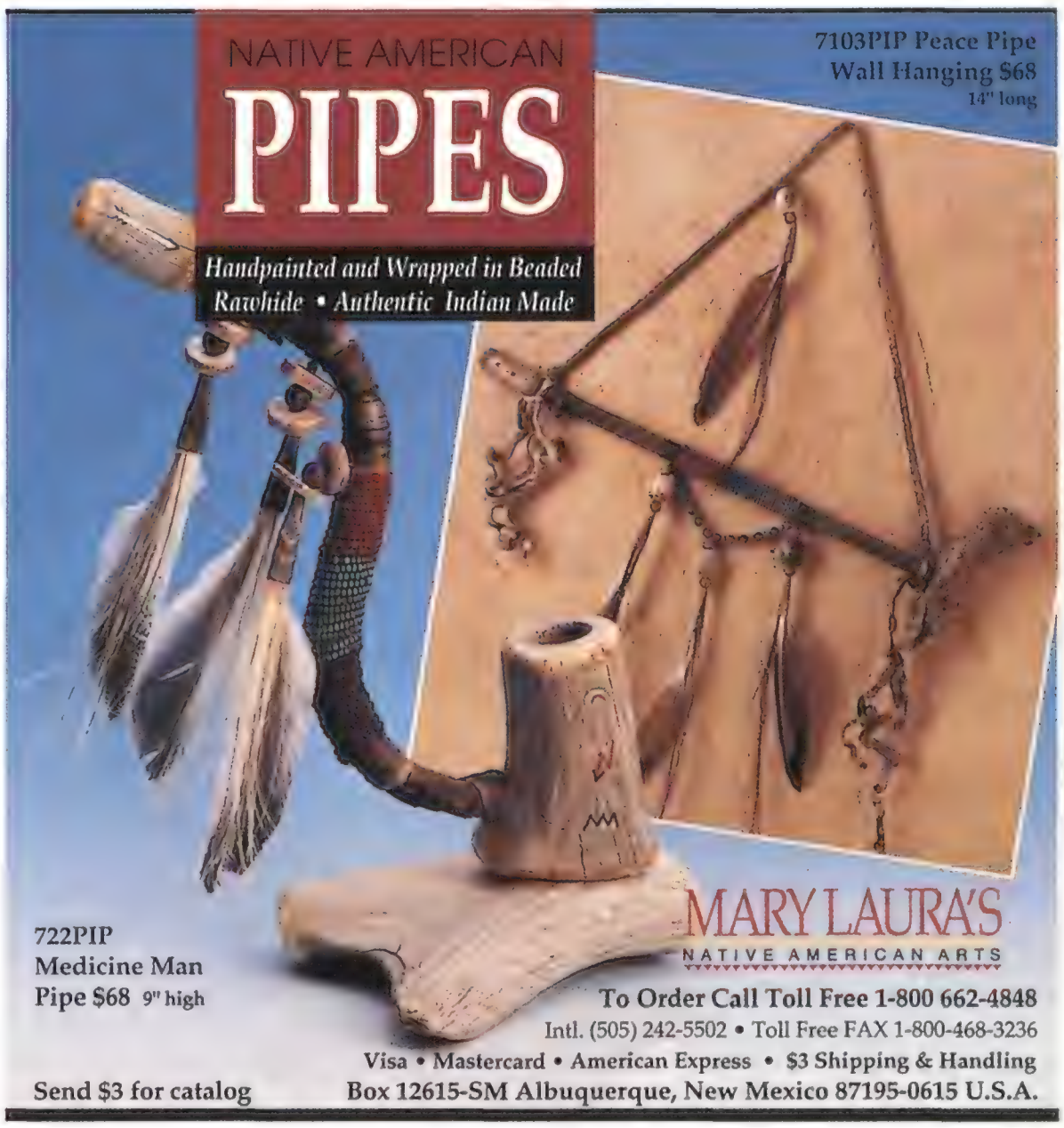
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Concourse and Rotunda Gallery
Monumental Propaganda (December 9-February 21, 1995) Proposals by artists for concepts for transforming Moscow into a showplace of post-totalitarian art.

Heye Center, National Museum of the American Indian (New York)
Creation's Journey: Masterworks of Native American Identity and Belief (runs indefinitely) First of three inaugural exhibitions features objects dating from 3200 B.C. to the present.
All Roads Are Good: Native Voices on Life and Culture (runs indefinitely) Some 300 objects celebrate the indigenous peoples of the Western Hemisphere.
This Path We Travel: Celebrations of Contemporary Native American Creativity (through July 30, 1995) Unique collaboration of 15 contemporary Native American artists.

Cooper-Hewitt,
National Design Museum (New York)
Good Offices and Beyond: The Evolution of the Workplace (through February 26, 1995) Office design in the 1970s and '80s.
The Structure of Style: Modernism in Dutch Applied Arts 1880-1930 (through February 19, 1995) Turn-of-the-century Dutch decorative and applied arts.

Exhibition catalogs

Catalogs available currently include:
Sacred Mountains of the World ($50/$25 paper)
Creation's Journey: Native American Identity and Belief ($45/$29.95 paper)
All Roads Are Good: Native Voices on Life and Culture ($55/$29.95 paper)
This Path We Travel: Celebrations of Contemporary Native American Creativity ($18.95 paper)
Free Within Ourselves: African American Art from the National Museum of American Art's Collection ($40/$22.95 paper)
Bruce Nauman ($35 paper)

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Radio Smithsonian's *Folk Masters* The award-winning series of traditional American music continues its new season on public radio nationwide with programs featuring blues, ballads and accordion kings of zydeco. Check listings.

For a free copy of the companion *Listener's Guide*, write: Office of Telecommunications, Smithsonian Institution, National Museum of American History, MRC 645, Washington, D.C. 20560.

Betsy Graves Reyneau's *Paul Robeson* (c. 1943) is in NPG "Points of View" show.

Resident Associate Program

To become a Resident Associate, or for fee and ticket information, call (202) 357-3030. December events include:
Peter and the Wolf and More (December 4; 2 P.M.) A concert of light Classical music for young people, ages 6 and up.
An Evening of Mystery with Walter Mosley (December 5; 7 P.M.) The celebrated crime-fiction writer discusses his fourth Rawlins mystery.

Smithsonian Institution Traveling Exhibition Service

SITES organizes and circulates exhibitions to cities throughout the United States and abroad. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560. Here are some December exhibits:
• Savannah, Georgia (December 10-January 22, 1995) *Africa's Legacy in Mexico: Photographs by Tony Gleaton*, King-Tisdell Cottage Foundation Inc.
• Sheffield, Ohio (December 3-January 15, 1995) *The Tongass: Alaska's Magnificent Rain Forest*, French Creek Nature Center.

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Highlights Continued

Jesse Treviño's unrelenting vision

Traffic skirts the tiled facade of San Antonio's Progreso Drug Store. The sky is a cloudless, vivid blue. The light is sharp and unrelenting. "I grew up in this neighborhood," says painter Jesse Treviño. "Like many Chicano artists, I was interested in my roots. I experimented with a lot of different styles but finally decided to paint what was around me—what I had grown up with—the things that were about me, about my family, my friends, my community. And I realized with this painting of the Progreso Drug Store that a lot of it was disappearing."

Treviño's community is the predominantly Mexican-American neighborhood of San Antonio's west side. His large-scale, realistic portraits of the people and places that compose that Texas community capture the texture, color and heart of life on the west side. Now a slice of that life has come to the National Museum of American Art in "Works by Jesse Treviño: New York, Vietnam, San Antonio," on display through January 8.

Here is *la tienda de Elizondo,* the general store run by the Elizondo family (p. 34). Here, too, is a portrait of a *raspa,* or snow cone, vendor, barricaded behind bottles of bright-colored syrup. "I know that man," says Treviño, "but I was not just trying to show him. He is part of the Mexican-American experience. I tried to show him as an important institution in the community."

As a promising San Antonio art student, Treviño won a scholarship to the Art Students League of New York. But a year into his studies he was drafted and sent to Vietnam. A poignant portrait of a Vietnamese woman carrying a baby on her back is also in the show. It was never finished. Beset by sniper fire, Treviño was severely injured. His right hand, his painting hand, was gone. But his talent and love of art were not. Two years later he enrolled in an art class at San Antonio College and learned how to draw with his left hand.

The clarity of Treviño's vision crystallizes the essence of place and opens a window on the spirit of his community.
Diane M. Bolz

Progreso (1977) details the landmark San Antonio drugstore, now part of the Guadalupe Cultural Arts Center. The painting helped rekindle west-side pride in its own "downtown."

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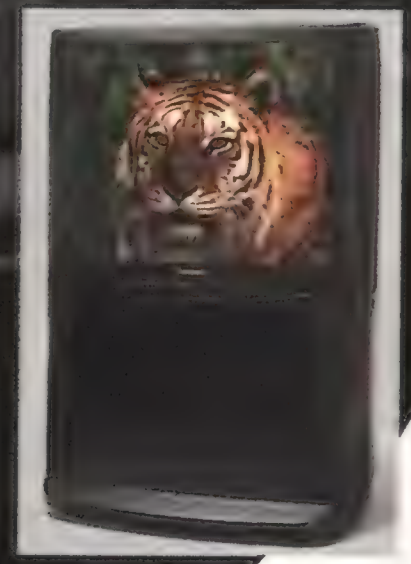

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Powerful portrait *Los Trabajadores* (*The Workers*) was done in pencil on paper.

Treviño painted this scene (1993) of the Elizondo store from an old photograph.

La Raspa (*The Snow Cone*), from 1976, casts the vendor as a symbol of working-class pride.

Unfinished painting of Vietnamese mother (1966) was rendered in tempera on a brown paper bag.

This nearly life-size, 6-by-7-foot depiction of the artist and his brothers was created in 1976.

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What A Luxury Car Should Be

Mark Morris Dance Group thrilled festival audiences with their two-hour interpretation of Handel's *L'Allegro*.

By Richard Covington

Every year in Edinburgh the show goes on . . . and on . . . and on . . .

Hailed as a masterpiece, it was performed in the new Edinburgh Festival Theatre, Britain's largest stage.

Man-become-statue impromptu on the Mound, a place filled with such acts, attracts little attention.

For three electric weeks, the Edinburgh Festival and Fringe attract a half-million people to the world's largest performing arts spectacular

"You absolutely must see this," commands Richard Demarco, an elfin character with flashing green eyes who firmly grasps my arm and leads me down the corridor of his venue, a converted primary school. In a courtyard he seats me on a bale of hay amid a packed audience that's riveted by an unlikely crowd pleaser—*Romeo and Juliet*, direct from Tallinn and performed in Estonian. Juliet stands serenely on her schoolyard balcony as Romeo grabs the spiked iron railing and hangs by his hands,

Photographs by Patrick Ward

A swimming pool is the unlikely venue for Ukrainian theater company's production of *Iago*, an adaptation of *Othello*. Actors incorporate the setting into the play, performing on cue as they dive into the water and swim.

wooing her. "Marvelous, enchanting," Demarco whispers in my ear. In spite of myself, I have to agree. I've completely forgotten that I don't understand a word and, relying on my memory of the play, concentrate on the exuberance of the performance.

Over the 47 years of its existence, the Edinburgh International Festival has witnessed countless Romeos wooing countless Juliets in virtually every language. The Edinburgh Festival, with some 150 performances this year—and its offshoot carnival, the Festival Fringe, with a mind-boggling 13,400 performances—and with participants from 36 countries, is the world's largest and certainly most rambunctious arts festival. Ever since legendary opera manager Rudolf Bing created the first festival in 1947, internationally renowned performers have flocked to Edinburgh for three electric weeks from mid-August to early September. Bruno Walter and the Vienna Philharmonic, Placido Domingo, Rudolph Nureyev, Marlene Dietrich, T. S. Eliot and Jessye Norman have all had Edinburgh openings. The Fringe, a free-form show open to all comers, has also produced a star-studded roster: Maggie Smith, Tom Stoppard, Derek Jacobi, John Cleese, Emma Thompson.

At festival time the city of Edinburgh turns into a wall-to-wall, nonstop performance space. The main festival fills several concert halls, including the brand-new Edinburgh Festival Theatre. Every garage, church vestibule, pub and park has someone pitching some form of entertainment for the Fringe. Performances happen in nightclubs and delis, moving buses and swimming pools. In this marketplace of the lively arts, performers compete to draw in audiences and, especially, London and New York producers and agents—even staging mock arrests to bring in talent scouts.

Richard Demarco guided my frenetic tour of the festival this past August. For three decades the quintessential manic impresario has been promoting Eastern European theater and dance companies at the event. When I first met him, Demarco was seized by a crisis of his own invention. He had invited both a band of Bosnian artists and a Serbian theater group to appear in his venue. The outraged Bosnians threatened to withdraw. After hours of heated wrangling, Demarco finally moved the Serbs to another area. The resolution came as a bitter disappointment to someone who has spent virtually his entire career bringing Eastern European performers to the attention of the West.

My festival pace was round the clock and exhausting. I wanted to miss nothing, but there was always more. More than anyone could dream. The official Edinburgh Festival and the Festival Fringe, that lowly tail that now wags the dog, goes on nonstop, day after day. I could

Last seen rehearsing for his Fringe debut, the author also writes for the International Herald Tribune *and the* Los Angeles Times *from his home near Paris.*

have started off at 9 A.M. with a children's show or perhaps some breakfast Shakespeare, and raced around from show to show until 4 the following morning. One benighted fellow (of which the Fringe boasts scores) with the apt name of Nigel Tantrum, was in fact doing exactly that: trying to break the previous Guinness record of 145 for most performances attended.

By Tantrum's benchmark, I was a piker and a laggard—taking in a paltry 30 shows in their entirety and perhaps 30 more in portions over the course of my 11 days. Apart from *Romeo and Juliet* in Estonian, I saw *The Bald Prima Donna* (or *The Bald Soprano*) in Latvian peppered with English; an all-wet *Othello* adaptation with Ukrainian actors periodically diving into a swimming pool; and a Scottish cast leading its audience through the Royal Botanic Garden in a freewheeling biography of the 18th-century Swedish botanist Linnaeus.

The official festival was no less eclectic, with performances by the Mark Morris Dance Group, the Berliner Ensemble, the Australian Opera, the Scottish opera and the miraculous Russian soprano Galina Gorchakova.

Let London's *Sunday Times* grouse that the festival has become "a grandiose holiday camp, plumbing the pockets of Britain's aesthetic class . . . a grindingly tedious audition tent for comedy moguls . . . an underfunded, sub-national rattle-bag of the arts." *I* had a *ball.*

As old festival hand and Edinburgh native Bruce Morrison explains, "The Fringe has always said, Come to me, all ye poor, huddled masses. There's no censorship, no one saying, I'm sorry we've already got 12 *Oedipus Rex*es going on. You do need money now. It's not like the old days when you hired a hall for £10, hung a few lights, jumped out of the costume basket and did your Shakespeare."

Morrison and I are sitting in a café at the corner of the Royal Mile (the main street leading from the gates of Edinburgh Castle) and North Bridge Street, a crossroads percolating continuously with festivalgoers. Outside, the inevitable mimes stand on one another's shoulders directing traffic with their promotional leaflets, and bagpipers blanket the city like a tartan lap robe. With 500,000 visitors to the festival, the population of Edinburgh doubles. Culture vultures descend en masse on every conceivable performance space, including largish holes in the ground where a very limited audience jumps in with the actors.

"I drew the line at *Macbeth*, with everyone crawling around in the mud, and the nonverbal Japanese experimental theater," cracks Morrison. "Life is too short. But then I remember plays like the Gertrude Stein piece for six voices. No one ever heard of it again, but the memory and the joy of it kept me going for weeks. That's why the festival is so precious, why performers keep coming back again and again."

Dressed head to toe in black leather, with sideburns slicing forward to knifepoints, Morrison cuts a sinister figure. He's in costume for his one-man show, *Auld Reekie,* a bawdy portrait of 18th-century Edinburgh by Scottish poet Robert Fergusson. The 36-year-old actor has been performing in the festival for 22 years, beginning with the 1972 production of Andrew Lloyd Webber's *Joseph and the Amazing Technicolor Dreamcoat.*

Out the window of the café a band of high school students garbed as World War I soldiers troops by, thrusting their leaflets into the hands of passers-by. "Every year, without fail, some group brings *Oh What A Lovely War,*" sighs the Fringe veteran. "It's wonderful seeing these students believing passionately that their production is worth bringing here. They'll do their play in their local college, where they're told they're wonderful and should go to the Edinburgh Festival. When they arrive, they find themselves here with 200 other groups who have been told exactly the same thing.

"I can see myself in the old days wandering up and down the street, pleading with people to come to our

Romeo hangs on every word as he woos the fair Juliet in an Estonian production staged in a school courtyard.

Fringe comedy star Woody Bop Muddy wields the "Golden Hammer" as he prepares to smash records.

Colorfully garbed entertainers try out their act on the Mound, hoping to gain attention and attract an audience.

performances. The joy is watching youngsters and remembering my joy. That's why I will always come back. I've measured out my life in Edinburgh Festivals."

Morrison told me about one woman he watched as she walked down the Royal Mile in her Japanese kimono saying (Morrison mimics a Japanese accent), "Ah-ii one-woman kabuki." "Is Edinburgh ready for this?" he asks. "The image of this poor woman thinking, 'I'm performing in the Edinburgh Festival, isn't that wonderful?' She's got an hour slot at Adam Smith House at 8 P.M.—not bad. But she still had to put on her kimono and slippers and join every other poor soul on the Fringe and pass her leaflets."

Morrison hastily gulps down his coffee, then stands up to leave. "Sorry to rush," he says. "Gotta go hand out my own leaflets."

Everywhere, hopeful performers pass out leaflets advertising their shows, breaking into a snappy sales pitch or a bit of dialogue at the slightest hint of interest from passers-by. Often I pause to listen. After all, one of them could be the next Emma Thompson or Derek Jacobi.

Jane Alexander, now chairman of the National Endowment for the Arts, wowed the Fringe in 1960 when she played Lady Torrance in Tennessee Williams' *Orpheus Descending*, while still an undergraduate. "We were the Fringe dramatic hit of the year," she recalls. "I was wined and dined and highly touted for my performance, causing me to decide to abandon my major in mathematics and commit myself to my lifelong dream of a career in the theater. It was a heady and incomparable three weeks."

As I dash from one performance to another, the festi-

They're those irritating songs we love to hate. Every place qualifies as a venue for a Fringe production, even the Royal Botanic Garden (right), setting for a drama on the life of 18th-century Swedish botanist Linnaeus.

val is the one constant source of conversation, amusement and contact—a flourishing word-of-mouth grapevine where anyone and everyone becomes a critic, if not an authority. In a delicatessen, over Scottish smoked salmon, I swap critiques with a local dentist anxious to steer me toward a musical by the Cape Town Youth Theatre in a nearby club. At the Richard Goode piano recital, I sit next to an Edinburgh banker, a passionate amateur pianist who'd brought along his bound folio edition of Beethoven's sonatas to follow note by note.

The easygoing atmosphere of the festival erases the barriers between performer and audience. Actors, dancers and singers whom I watched onstage one night would show up the next day in the audience of another concert or play. I struck up a conversation outside the Traverse Theatre with the baritone I'd seen the evening before in the Australian Opera's *Midsummer Night's Dream.* We both agreed that the performance we just witnessed—Tom Courtenay as a philosophic Muscovite drunkard—was among the best of the festival. The event is tailor-made for such chance encounters.

There was no place to escape the performers even when I tried. There was one doughty actress of a certain age who appeared around midnight in the bar of my hotel. After a brief pitch for her show, she began belting her heart out in a foghorn voice that would have made Ethel Merman proud. Several customers, who turned out to be the Canadian cast of Robert Lepage's *Seven Streams of the River Ota,* applauded politely. "God, what I won't do to sell tickets," sighed the exhausted trouper.

"The Edinburgh Festival began while the Presbyterians had their backs turned," Demarco, a Roman Catholic and third-generation Edinburgher, explains with a facetious wink. "The man who got away with it was certainly not Scottish—he was an Austrian named Rudolf Bing. Now he knew a thing or two."

Seated inside his office for our interview, Demarco constantly pops up to welcome, cajole and occasionally bark orders to an endless parade of performers, volunteers and old friends who drop by.

"The festival turns Edinburgh into a butterfly overnight and, like a butterfly, it has a very short life," muses Demarco. "For me the year ends when the festival ends. It's like the circus leaving town."

When the circus first rolled in, Rudolf Bing (who later gained renown as the long-running general manager of New York's Metropolitan Opera) was an opera house director without an opera house. With the Glyndebourne Opera in East Sussex closed because of the war, Bing started casting about Britain for a suitable alternative. Dour Edinburgh, often a tryout town for shows bound for London, had suffered little war damage and possessed a surfeit of ornate concert halls. It helped that a noted local racehorse enthusiast, Lord Rosebery, pledged a considerable sum to the cause to please his opera-loving wife. "Just when Bing was ready to give up on funding," Demarco explains, "Lord Rosebery says, 'One of my horses has just won a pile. If you need seed money, there it is.'" Sounds apocryphal, but it's true, swears Demarco.

The opening performance of the first festival was loaded with symbolism. The legendary German conduc-

tor Bruno Walter, whom Hitler had driven into exile, was reunited with the Vienna Philharmonic for an emotional rendition of Gustav Mahler's "Das Lied von der Erde" ("Song of the Earth"), with the queen of England in the audience. With the festivals at Salzburg, Bayreuth and Glyndebourne temporarily halted, Edinburgh became a unifying beacon for postwar European culture.

In the early years, the festival tended to concentrate on music. The New York Philharmonic under Dimitri Mitropoulos performed there in 1951 and '55. The crusty, cigar-chomping conductor of the Royal Philharmonic, Sir Thomas Beecham, who denounced the very idea of a world-class festival in provincial Edinburgh as a "foredoomed absurdity," became a frequent guest and a wholehearted supporter.

Rising stars and memorable openings

Within a few years, drama and dance filled the venues. In 1948 theater director Tyrone Guthrie staged a landmark production of *Ane Satyre of the Thrie Estaites*, a savage attack on the Scottish clergy and rapacious nobility, by medieval playwright Sir David Lyndsay; T. S. Eliot premiered *The Cocktail Party*; and a rising star from the Old Vic, 27-year-old Richard Burton, appeared as Hamlet.

In the memorable 1965 season, the Royal Lyceum Theatre started evenings off with James Baldwin's racially charged *Amen Corner* and made way for a late-night cabaret act by 64-year-old Marlene Dietrich.

Rudolf Nureyev brought the Paris Opera ballet, and Margot Fonteyn performed in *Swan Lake* with London's Sadler's Wells company. In the 1970s, Placido Domingo sang Don José in *Carmen*, and Jessye Norman astonished audiences at her morning recitals in the Queen's Hall.

"There is absolutely no doubt the festival can make—or break—reputations," asserts Brian McMaster, the festival's eighth director, who came to Edinburgh three years ago from the Welsh National Opera, which he helped thrust into international prominence. Like the previous festival directors, he follows his own predilections in choosing programs. This year he concentrated on American dance and invited Merce Cunningham and Mark Morris; a Beethoven cycle included a full day devoted to his only opera, *Fidelio*; and there were also operas and orchestral works of Emmanuel Chabrier, a neglected 19th-century French composer.

"It's been a trying morning," says McMaster, sitting down in the festival office for a hasty cup of tea. "We're only five days into the festival and already it feels as if it's been going on for three months." The previous night, minutes before the audience was scheduled to arrive for a performance of *Antony and Cleopatra*, the lighting short-circuited. It was yet one more crisis for the problematic play; earlier McMaster had had to persuade the uncompromising director that the audience would not

On Fringe Sunday, a thousand performers put on fragments of their shows to entice a paying audience.

sit still for four hours without an intermission. Eventually, the director relented. As the audience took their seats, technicians repaired the lights. "The performance was absolutely fantastic," sighs a relieved McMaster.

Since the $8 million official festival turns a small profit—ticket prices range from $7 to $73—and this year broke all attendance records, many of McMaster's choices proved to have been on target. One hit of the past three festivals has been the Mark Morris Dance Group. Last year's staging of *Love Song Waltzes* particularly endeared Morris to his audience because the company had to perform in a gymnasium. The day before, a fire had broken out in the Playhouse Theatre, and in less than 24 hours the technical crew masked the basketball hoops, hung waves of fabric as scenic backdrop and balanced the acoustics in the cavernous space. "Everyone lined up to sit on horrible bleacher seats," Morris recalls. "It turned out to be wonderful." This year, the group opened in the brand-new Festival Theatre, a glittery glass-fronted structure with a lovingly preserved rococo interior.

From the beginning, the Fringe took an alternative stance to the official festival, in its first year squeaking away with fewer than ten shows, performed by eight companies that had been rejected but came anyway. By

This free-for-all carnival fills Holyrood Park, once the peaceful hunting preserve of Scottish royalty.

Young woman passing out leaflets to attract festivalgoers is going through a rite of passage for all Fringe players.

1960 there were 50 unofficial shows, and the numbers multiplied until the Fringe became the mouse that roared. In the past 15 years, the Fringe has been accepted as the raggedly experimental, occasionally revelatory complement to the more mainstream event.

On Fringe Sunday (always the second Sunday of the festival) the offshoot festival goes into high gear when a red-and-blue-swabbed tribe of what appears to be Druid banshees madly charges down the sere, the straw-colored moor above Holyrood Park, shrieking in savage, primordial cries. They descend into a sea of Fringegoers and a thousand performers scattered over the vast greensward that had once been the hunting preserve of Scotland's kings and queens. Fringe Sunday is a combination medieval fair, street theater, political cabaret, children's circus, New Age market and Scottish hootenanny. I watch one enormous sampler of performances, where more than 100 acts compete for attention on the backs of flatbed trucks, in circus tents, on outdoor stages and in improvisatory circles on the grass—all for free. For 15 minutes per act, they have the chance to strut their stuff and attract a paying audience to come see them perform—the average ticket costs only $8.35.

Diving in, I drift into the crowd that's guffawing at a half-naked clown who stretches a rubber glove over his head, then blows it up to the size of a basketball. I spot a quartet of two men and two women, androgynously dressed in black suits circa 1920, sitting on chairs and leaning meaningfully against one another. I take a leaflet extended from an immobile hand. Of course! They are the Bloomsbury group—Leonard and Virginia Woolf, Lytton Strachey et al.

I grab a vegetarian haggis and install myself on the ground in front of a tented pavilion to watch a Brazilian troupe spoof a television soap opera, with all the passionate moves. "Their other piece is much more polished," whispers a woman next to me.

As the afternoon shadows lengthen and exhaustion begins to set in, I catch sight of five blues musicians outlandishly dressed in green tartan zoot suits and black homburgs. The saxophone player leaps off the stage and tootles his way through the crowd, with a line of children trailing behind him. Back onstage, he climbs onto a large loudspeaker, hooks his legs over the steel roof frame and blows away upside down, coins raining from his pockets. He has my full attention. I'm ready for another evening on the prowl for greatness. The show does go on, and it's unstoppable.

"The British have this peculiar malaise of knocking success," complains Hilary Strong, the director of the Fringe. "In this country, we apologize for it and say, 'The Fringe is getting too big and it needs more control.'"

Seated in an office only marginally less frenetic than Demarco's, Strong is completing her first year as director. She takes a distinctly populist approach to the Fringe, glorying in its anarchic, eye-opening mix of high art and low entertainment. She concedes that many people come to the Fringe to watch comedy acts and little else. In recent years the Fringe has been criticized for focusing on

Richard Demarco, the indefatigable impresario of Eastern European acts, squeezes in a BBC interview.

them, but Strong believes "this country has a long history and tradition of satire and comedy dating back to Chaucer. It's what we sell, it goes all over the world. We need to encourage it and develop the art form."

Theoretically, anyone can perform at the Fringe, though it does take some preparation, financial backing and a healthy skepticism. This year, 40 groups came from the United States—Strong holds Fringe conferences in New York and Los Angeles in January to brief prospective performers. The Fringe office produces a comprehensive guide to all the performances; a basic listing costs $375. The office also gives advice on the 128 Fringe venues: small church halls several miles from the town center charge as little as $150 a week, while others cost up to $3,000 a week for a prime 8 P.M. slot.

Based on their Fringe success, unknowns can still become overnight sensations, but it happens more and more rarely. According to Carol Sarler of the London *Sunday Times*, only 40 of the 1,275 Fringe shows stand any chance at all of "rags-to-riches success." Of these, fewer than ten will make it, and they undoubtedly have professional managers bankrolling them.

The slickly professional venues appear to be in the entertainment business in a big way. Theatrical agents and TV producers from London haunt the corridors and private bars, scouting out potential acts and booking discoveries for future appearances and tours.

"This is a controversial issue because a lot of people believe that big business is not in the spirit of the Fringe," says Strong. "The risk is that the Fringe will become a two-tier affair—glossy, glitzy stuff at one end and the worthy, hardworking, struggling artists at the other—which I would deplore."

The image of struggling artists can best be described by Lee and Jean Korf, retired drama professors from Southern California. They've been bringing college theater groups to the Fringe for the past two decades. When I asked them why they return year after year, Lee, an irrepressible 77-year-old, quips "Temporary insanity!" This year they stand to lose around $9,000 in exchange for the eight groups they brought over to play in a cramped banquet hall off the bar of the Roxburghe Hotel. But there are other rewards. "Saying one's college played the Edinburgh Festival might mean a little more support, more prestige," Lee points out. "The Fringe has become much more commercial, more expensive, more competitive, but it's still an extraordinary and thrilling experience."

On my last day at the Festival, Richard Demarco has again taken me by the arm, pulling me into another performance—Ionesco's *The Bald Prima Donna*, staged by students from an agricultural college in Latvia.

"Guess what's happening?" he asks, breathlessly shifting gears. "The Galicians have invited the Bulgarians to perform. Yvette Boszik from Hungary has been invited to give master dance classes at Kingston University near London. The French government is inviting the Estonian production of *Romeo and Juliet* to Paris for the Festival d'Automne in 1995.

"Come with me," Demarco continues. "You absolutely must see this." Here we go again. I had long since learned the cardinal rule of the Fringe. Never resist an impulse, never resist the pull of the angels, whatever form they take. Even though I am now feeling as though I've lived half my life at the festival and the Fringe, I have barely scratched the surface. How seductive it would be to measure my life out in Edinburgh Festivals, along with Morrison, Demarco and thousands of other festival addicts. Too soon, this brilliant mayhem and occasional, forgivable mediocrity will come to an end.

As Edinburgh's most famous and ambivalent son, Robert Louis Stevenson, kept upbraiding any dour Scots bound and determined to stay put, stuck in place on the globe or in spirit: "To travel hopefully is a better thing than to arrive, and the true success is to labor." For three weeks every summer, nowhere is there a greater concentration of hopeful travelers than in this stony, seagirt capital by the Firth of Forth.

Speaking of hopeful travelers, did I mention my debut as a dancer? I was plucked out of the audience for 90 seconds in the limelight—a heady, Jane Alexander-like experience. I may be back next year with my own company. Or maybe I should try comedy instead. Just a few rehearsals, some massive promotion, and I'll be ready to join that inimitable mecca of holy fools. Is Edinburgh ready? Here, take a leaflet.

Against the backdrop of Edinburgh Castle, the Scottish regiments' pipes and drums march in a military tattoo.

Extraordinary things come to those who think outside the box. For example, the 5-cubic-foot increase of significantly more rear leg room. All created in a car that seemingly had little room for improvement. An

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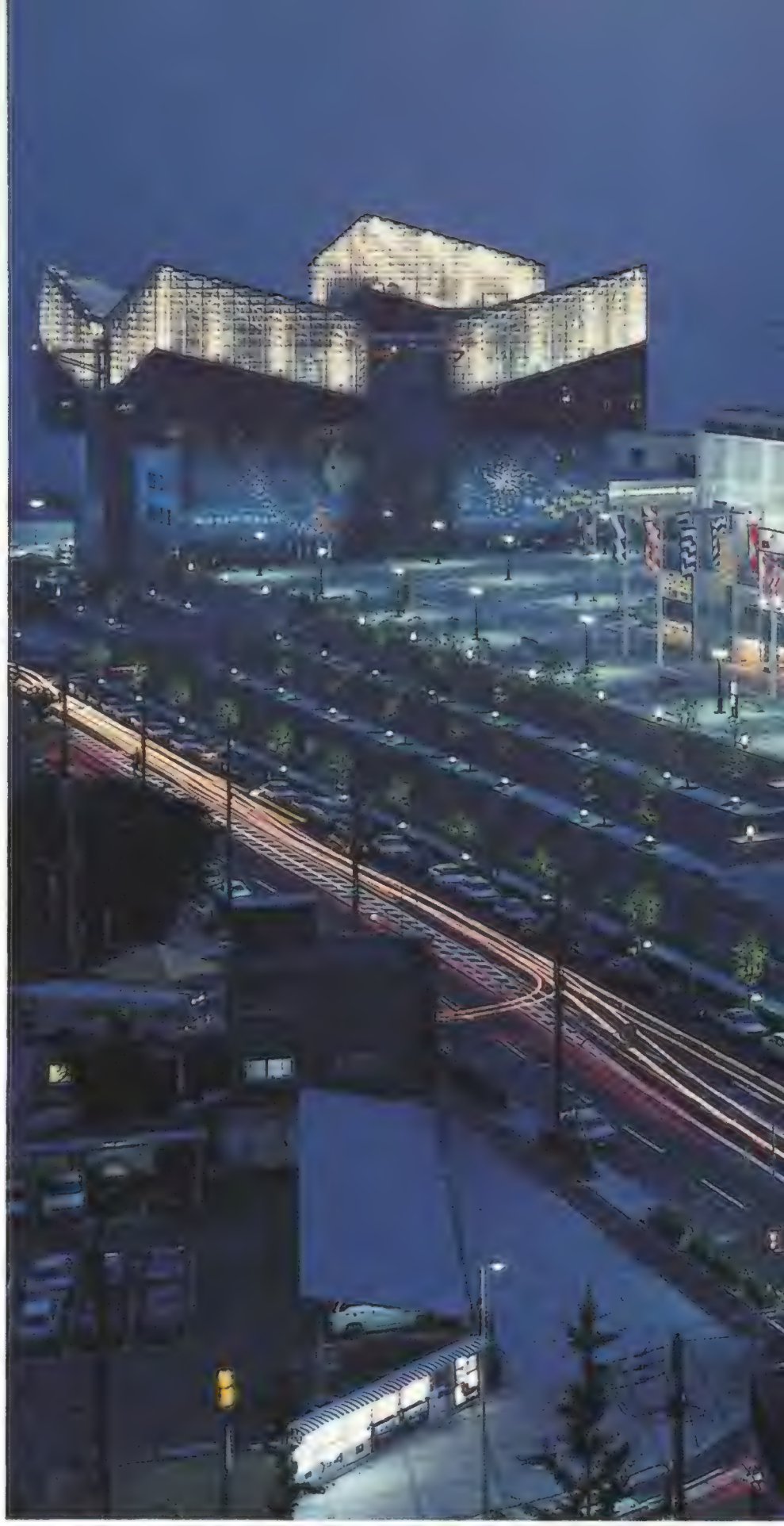
By Fred R. Smith

A new wave of aquariums brings the ocean ashore

Architect Peter Chermayeff and his Cambridge Seven have revolutionized the display of aquatic creatures and their underwater world



Peter Chermayeff is a boy of 58. His childhood love affair with frogs and tadpoles, minnows and crabs in the bays and ponds of Cape Cod turned, on a July evening in 1990, into an adult epiphany. He swam for an hour in the shadow of a 17-foot whale shark which, even half-grown, was the largest fish in any aquarium in the world. "It's her building; she has simply taken full possession," said Chermayeff, describing the shark's awesome presence as she moved around the immensity of the 1.5-million-gallon Open Pacific tank, the core of the Ring of Fire Aquarium in Osaka, Japan, which had opened to the public earlier that day.

He and his colleagues from Cambridge Seven Associates have been designing aquariums, museums, libraries, transportation systems, offices, schools, hotels, shopping centers and campus buildings for more than 30 years. The aquariums they have created for Boston, Baltimore, Osaka and Chattanooga have changed the waterfronts of those cities and the way people look at the aquatic world. At the 1993 convention of the American Institute of Architects, Cambridge Seven was named the Firm of the Year for its exemplary body of work, particularly for its creation of "joyful places . . . stunning urban centers of marine life and learning."

As he swam in the Osaka tank, Chermayeff could see his family on the other side of the foot-thick acrylic walls that held back 5,400 tons of water. Rays shaped like stealth bombers, schools of mackerel and jacks, giant perch, cobias, rainbow runners and many others moved in balletic rounds. The tank's cruciform shape and the pattern of water supply and return were designed to produce varied currents and eddies so that the whale shark and the schooling fish would parade in figure-eight patterns around their salty domain, moving left, right, left, right. This not only brought them closer to all the spectators surrounding the crystalline walls, but produced a more natural and healthy swim pattern than the one-directional round-and-round of ocean fish in the circular tanks of earlier designs.

The Ring of Fire Aquarium, at top left, sits next to a sacred island in the harbor of Osaka. The large building at center is the Tempozan Market Place, repeating a pattern popular in Boston and Baltimore.

As a young man just out of the Harvard architecture school, Peter Chermayeff was ambivalent about practicing architecture and thought of becoming a filmmaker. While at Harvard he made a children's film that is still in distribution. Called *Orange & Blue*, it features two bouncing balls on a visit to a junkyard filled with such castoffs as railroad cars, Army tanks, printing presses, culverts and bathtubs. He has since made 11 other films, portraits of African wildlife.

But in 1962, when he was 25, he heard that a Boston group was planning to build a public aquarium. "I hardly knew what an aquarium was, beyond a fish tank, but I wanted to build this one," Chermayeff says. "I remembered one powerful experience when I had gone to a Florida oceanarium before it opened, early one morning, and saw down a dark passage a window of water with daylight beyond. A large, living form glided across the window, a dolphin, and I was struck by its mysterious

Design and architecture professor Serge Chermayeff is seen with his wife, Barbara, and sons Ivan and Peter in 1945 (above). Ivan and Peter today (right) stand behind an early model of their aquarium in Osaka.

presence and a sense of personal connection. Surely, in a public aquarium in Boston that kind of magic could be offered, something fundamental that large numbers of people might share.

"Six friends joined with me to pursue it, including Paul Dietrich, Terry Rankine and Louis Bakanowsky, all architects, and my brother, Ivan, and Tom Geismar, both graphic designers, who were already in practice in New York. We made a presentation of underwater ideas, of exhibits and architecture, alternating the dark and the light, the active and the passive, the opaque and the transparent. There would be animals to see close up, and habitats to ponder. We got the job and formed Cambridge Seven Associates, supported by a joint venture with Bill LeMessurier, a distinguished structural engineer, and began work to conceive an institution."

The Chermayeffs are a dynasty of design. Ivan, the elder brother by four years, with Tom Geismar, has created corporate images for NBC, Mobil, Chase Bank, PBS and hundreds of others, and has designed exhibits for the Smithsonian, the Statue of Liberty, Ellis Island, the Museum of Modern Art. Their father, Serge, now 94, was a legendary professor of design and architecture at Harvard, then Yale. Peter calls him "a tough critic but one who nurtured talented students. He was always a boundary crosser and a maverick. We were endlessly stimulated by his searching, demanding views."

It took seven years to develop and build the New England Aquarium. And Peter, Paul Dietrich, Ivan and the rest of the team were learning as they designed for a most unusual mix of clients: first, the living aquatic specimens; second, the aquarists who would care for them; third, the public; and fourth, the owners who paid the bills. "From the very beginning," says Peter, "we were exhibit designers first, architects second. The interior content drove the shape of the package."

It was the very first of a whole new kind of aquarium, with a daylight-excluding, four-story gallery space, and at its heart a three-story cylindrical ocean tank that simulates a coral reef. Ramps and bridges move visitors upward at first to the galleries and then downward in a spiral surrounding the central tank. Peter shaped the model of the first reef himself, out of modeling clay. Constructed at low cost for the opening, it was built of concrete, urethane foam and fiberglass. Several years later a more detailed simulation of coral habitat diversity was designed and fabricated by the aquarium staff.

The technologies of big acrylic window walls, extremely lifelike simulations of rocks, coral, seaweeds, trees and other plants, and the ozone water-purification systems of today did not yet exist. But the aquatic museum concept, the urban location, the lighting, the story lines, the graphics, the habitats and, above all, the presentation of the animals, always the stars of the show, were so com-

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pelling and innovative that the New England success began a wave of aquarium building that continues to sweep across North America, Europe and Asia.

When the New England Aquarium opened in June 1969, privately financed at $6 million by a group of corporations and individuals, the once derelict Boston waterfront was reborn. Central Wharf, the site, was purchased for $1 from the city in 1962 and today has an estimated worth of $50 million or more. The aquarium was projected to attract 600,000 visitors a year, but soon after the opening, attendance reached 1 million and has stabilized during recent years at around 1.3 million. The aquarium sits within walking distance of the shops and restaurants of the enormously successful Faneuil Hall Marketplace, James Rouse's flagship of urban renewal. An aquarium built as a centerpiece attraction, and near such a marketplace—as was soon repeated in Baltimore—has become part of waterfront planning for cities as far away as Osaka.

Cambridge Seven's offices are in a rooftop space on Massachusetts Avenue overlooking the spires of Harvard. At full strength, 50 architects, exhibit designers, model makers and assistants fill the modules of a lofty studio, daylighted from a huge north-facing wall of glass. The lobby and corridors contain a miniature amusement park: models of aquariums and similar projects.

One, for example, is a child's fantasy of a model for an Amazon rain forest, showing 120-foot trees to be placed under a climate-controlled greenhouse structure, with glass elevators to carry visitors to the forest canopy and treetop walkways. Peering past the fig trees, tupelos and lianas, one sees tiny parrots, macaws, sloths and monkeys, and on the jungle floor, egrets, ibis, caimans, capybaras, tapirs and ocelots. Streams and pools are filled with Amazon fish. The rain forest project is only a concept at this point, yet to be built. "I'm hoping to build it in Japan," says Peter Chermayeff. And he would be very proud to do a similar one in Russia, the land from which his father emigrated before the 1917 revolution.

A model way of raising money

Model making is a part of the design process in many an architect's office, but here it is not only a fine art but a unique necessity. The projects are too three-dimensional to understand through drawings alone. Models contribute to the dialogue between the design team and clients who must visualize buildings different from any they have ever experienced. Chermayeff and his colleagues travel the world with specially made cases and crates that nest the models like the precious creations they are, reassembling them for presentations that help raise the extraordinary amounts of money it takes to build anything so complicated.

A model of the entire Osaka project—the aquarium, marketplace and plaza, exquisitely detailed, with toy boats in the harbor and banners flying above the shops and restaurants—is displayed in an acrylic case in the Cambridge Seven entrance foyer. This model, and others now in Japan, played an important role in the success of the $216 million project, the most ambitious completed example of Cambridge Seven's work.

It began when a group led by Keisuke Morita, director of the City of Osaka's Port and Harbor Bureau (and later managing director of the Osaka Waterfront Development Company), asked Chermayeff and his colleagues to produce a poetic statement that could become as memorable a symbol of Osaka as the opera house has become for Sydney and, above all, a place that would give the urban Osakan an experience of nature and the sea. Flying home with colleague Frank Zaremba, who was helping with exhibit design, Chermayeff looked out of the plane window in mid-Pacific and said, "That's it. The Pacific must be our subject."

Circular central tank dominates interior of Boston aquarium; rocks and shallow pool are penguin area.

Architectural delights bring the sea ashore

Cambridge Seven was asked to meet a crushingly short deadline—less than three years from conception to opening day, and the location was halfway around the world. Back in Cambridge, Chermayeff, Zaremba and others began to flesh out possibilities for exhibit content, the starting point. In a week they had a thematic image, the "Ring of Fire," a phrase often used to describe the tectonic and volcanic activity that surrounds the Pacific Basin. The aquarium would celebrate this Ring of Fire as a "Ring of Life," circling through eight distinct areas at the edge of the ocean, beginning with Japan, moving up and across the Pacific to the Aleutians, down to Monterey Bay, the Gulf of Panama, Ecuador and Chile, Antarctica, New Zealand and back around to the Great Barrier Reef.

Chermayeff divided the staff into teams. Peter Sollogub was placed in charge of developing the interior configuration and the form of the building to present an experience of the entire Pacific, above and below the water. Sollogub, who has worked on many Cambridge Seven projects, is a brilliant architect as well as a talented draftsman and illustrator. He speaks with staccato intensity, reliving the creative process as he takes a visitor through the development of the building, showing a series of preliminary models no larger than his fist. He describes the weeks of work with his team as "magical—we didn't have time to make a mistake."

The first model was made of Lucite blocks, transparent to help the team imagine looking across a central tank filled with an enormous amount of water to other tanks on the far side. "Peter Chermayeff wanted spectators to enter the world of the fish, to be completely surrounded by water as they moved around the Pacific, to have a sense of being completely submerged and to look through layers of water realms in the foreground to ones beyond," says Sollogub.

While Sollogub's group was working on the interior composition, public circulation, views through water layers, and the exterior shape, a second team, coordinated by Frank Zaremba, was at work defining the exhibit habitats and the life that would inhabit them, from rocky coasts to coral reefs, from otters and penguins to giant crabs, rays and sharks. A third team, led by Bobby Poole, an architect and partner, addressed life-support systems, husbandry and mechanical systems, consulting with curators, biologists and many engineers. It was, from start to finish, a "charrette," the architecture student's term for frantic round-the-clock design work, derived from the way candidates for degrees at the Ecole des Beaux-Arts in Paris were compelled to finish their end-of-term projects. Three months after the work began, a group of Japanese planners led by Keisuke Morita came to Cambridge. And overnight they gave the scheme the go-ahead.

Because the aquarium was being built in earthquake-prone Japan, Poole developed with the structural engineers a foundation that places the entire building on silicone plates. "The whole building is one self-contained unit. In a quake it would move back and forth," says Poole, "and while there would probably be major sloshing in the big Pacific tank, the water level is 20 feet below the rim, and we believe that the fish and the water would stay in the tank, even in a Richter 8 earthquake."

An early Japanese plan had located the aquarium at the entrance to the waterfront development on an inland part of the site, with a marketplace at the water's edge overlooking the sunsets. But Peter Chermayeff felt strongly that the landmark statement of the aquarium building should be harborside, a beacon by the water, and the marketplace should be an open design, a sort of filter one walked through and looked through on the way to and from the aquarium.

Chermayeff and Sollogub flew to Osaka with models and pictorial renderings of the two alternatives. A meeting took place with more than 20 Japanese on one side of the table and the two Americans and a translator on the other. "With their business cards, in the Japanese manner, in front of us, and ours in front of them," says Sollogub, "it looked as if we could be playing solitaire, and they could be playing blackjack. The next morning, to our delight and surprise, the Japanese agreed to our plan."

The Ring of Fire Aquarium towers eight stories high and is topped by four glass pyramids. It contains 286,000 square feet of floor space and 16,000 animals, and cost $130 million, with another $56 million for the marketplace and $30 million for the raised plaza with a garage below. The entire waterfront project was funded by a consortium of the City of Osaka and 27 Japanese companies. It was their expectation to amortize the investment over a 10- to 15-year span, but with more than four million visitors a year since the July 1990 opening, and substantial retail sales and restaurant re-

In Chattanooga, walkways bisect the aquarium. This is Nickajack Lake, created by a TVA dam.

Gator rests its tail on downed trees in the Delta exhibit; they had been felled by Hurricane Hugo.

In a Cove Forest stream, brook trout swim into current, alert for edibles coming downstream.

Trout hover beneath a waterfall in the Cove Forest, one of few temperate forests under glass in the world.

Colorful Gulf of Mexico fish swim among mangrove prop roots where river water finally meets the sea.

turns, the prospect is that it will be paid off very soon.

All of the Cambridge Seven projects involve a variety of experts. Bill Flynn, former president of the Tennessee Aquarium in Chattanooga, supervised the acquisition of marine life on the American side of the Pacific. An Australian sound-recording engineer, Les Gilbert, flew all around the Pacific Rim to record birds and other wildlife for the soundscapes that have become a part of all Cambridge Seven aquarium environments. James Wertheimer and others of the Larson Company of Tucson, Arizona, designed and fabricated geologically accurate artificial rockwork for each habitat, as well as trees and other plants, and 1,200 pieces of coral simulating the Great Barrier Reef.

Ivan Chermayeff designed an immense mosaic mural of a seascape to be made of ceramic tiles on the five-story facade facing the plaza. A computer-generated artwork showed the position of every tile. "The next time I went to Osaka," says Peter, "I was dumbfounded to see 15 Japanese tile workers lined up on a scaffold, each with baskets next to them containing an eight-hour-day's worth of tiles in 16 colors, and each with our computerized artwork as a guide. At the end of the day, placement of colors and alignment, top to bottom, would be just right and exactly straight, plumb and level, corner to corner. All done by hand, it was an astounding demonstration of craftsmanship."

"Total immersion is the watchword in today's aquariums," says Steve Kesler of Reynolds Polymer, which has become the largest maker of acrylic walls. Osaka contains more than $7 million worth of acrylic, half of it by Reynolds, the rest by the Japanese firms Mitsubishi and Sumitomo. "Even the largest panels, the ones that surround the central Pacific tank and are 12 inches thick, have virtually the same optical characteristic as crystal," says Kesler. "Sodium glass would have a green tint. The refracting surface of the acrylic is so fine that even when there's a smudge of algae or a wayward mollusk on the inside wall, you can't see the thickness." Today, Reynolds has the capability to cast a monolithic piece 27 feet long, 10 feet high and 14 inches thick.

Travelators in the Baltimore aquarium carry visitors past skeletons of a fin whale and a white marlin.

A case of biophilia in Chattanooga

Chermayeff frequently invokes the ideas of Harvard biologist and Pulitzer Prize-winning author E. O. Wilson. In the spring of 1992 Chermayeff took his wife, Andrea, and 6-year-old daughter, Jessica, to the opening of the Tennessee Aquarium, another Cambridge Seven project. "We entered the swamp exhibit, hearing the birds, seeing the tall trunks of the cypress trees, feeling the humidity, smelling the water plants. Jessica rushed to one of the transparent acrylic panels and pressed close to watch a baby alligator inches away in the water. She counted the fingerlike toes, looked it in the eye and was amazed. She was demonstrating what Wilson calls 'biophilia,' the human bond with other species, our tendency to focus on life and lifelike processes. As Wilson says, we learn to distinguish life from the inanimate and move toward it like moths to a porch light."

Six-year-olds aren't the only ones who act like moths. Chattanoogan Les Kirk is beside himself one day as he watches trout behavior in a tank at the Tennessee Aquarium. At the top of the $45 million structure, the world's first major freshwater aquarium, a waterfall tumbles into a sink, a deep pool carved by falling water. Here, behind acrylic windows, brook and brown and rainbow trout gather in upstream-facing phalanxes in the shelter of eddies formed by rocks, periodically moving out into the current, searching for the food the stream brings their way. Kirk, active in Trout Unlimited, runs the Choo Choo Fly Fishing Shop. He had taken Peter Chermayeff and Peter's son, Nicholas, on a three-day fishing excursion into a Great Smokies wilderness area in the spring of 1988, when Peter was planning the aquarium. The splendid reality of the rock cliff and waterfall, the sink, flowing stream and the entire oozing, trickling foggy habitat is the result. Kirk, face-to-face with his quarry, can't resist going through the motions of casting as he describes just where to lay a fly.

A one-person-wide escalator transports visitors up to the very top of the Chattanooga aquarium. On the way up, there is the cheerful sound of a burbling mountain stream. Overhead videos of the stream swirl as the sound evolves into an East Tennessee mountaineer's fid-

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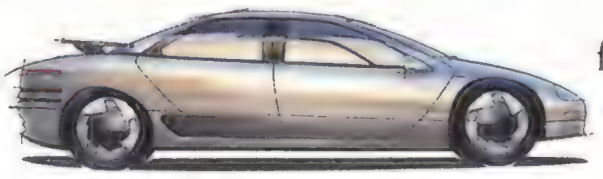

Chrysler's Portofino concept car was the first incarnation of cab-forward engineering.

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†*Always wear your seat belt.*

A sandtiger shark and two jacks swim placidly inside the Baltimore aquarium's oval-doughnut-shaped tank. Design was the first to give sharks long straightaways so they could glide, giving them a chance to rest.

dle. At the top, a balcony with glass walls overlooks the river below and the green hills beyond, and then a path leads between limestone cliffs into the Appalachian Cove Forest exhibit. Quail scratch in the loamy soil, and the call of "bobwhite" is in the misty air. Live ferns and mosses, violets and trillium, dogwood and laurel grow beneath towering replicas, real as life, of primordial tulip trees. Hidden in the trunks of these trees are climate-control ducts and mist pipes. A waterfall cascades into a mountain stream. Two frisky river otters dive and play in their mountain pond. The limestone escarpment is a mix of molded fiberglass and concrete, but moss still grows on its surfaces. Upper-level panes at the sides of the pyramid are open to let in the day and its climate, year-round. To make certain that deciduous trees drop their leaves, pipes in the ground cool their roots. Ramps descend through the central canyon that divides the structure down the middle, taking visitors from the height of the Smokies to descending streams, lakes and rivers, all the way to the bayous of the Gulf of Mexico.

If there is a Chermayeff architectural signature, its origins can be traced to the exuberant silhouette of the National Aquarium in Baltimore, which opened in 1981 and is Maryland's number-one paid tourist attraction. A handsome waterfront icon, its facade is colorfully faced in a bright, yacht-burgee mural; designed by Peter, its concrete structure is crowned by towering, right-angle glass pyramids. Pyramids now top Cambridge Seven aquariums from Osaka to Chattanooga. When Baltimore opened, Paul Goldberger, then architecture critic for the *New York Times*, wrote, "all those concrete shapes and glass pyramids that architects seem to love . . . have [at last] found their proper place."

For Chermayeff, those pyramids have as much reason for being as a tank filled with fish. They are greenhouse structures that top aquariums with related terrariums. "The line between terrestrial and aquatic exhibition is being blurred," he says. In Baltimore he capped his creation with an Amazon rain forest. (Other lines are blurring: the Smithsonian's National Zoological Park is becoming a botanical park as well.)

Chermayeff has become very keen on another idea, introduced in Tennessee, which is that a presentation of regional natural history can have a greater impact if connected to the people of that area. "We found that by using regional music in soundscapes, and artifacts, such as tools, toys, folk art and other traces of cultural history, we could produce a kind of low-key sensory collage,

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Far from their Southern Hemisphere range, these penguins look thoroughly at home in Osaka.

interweaving a regional awareness with the dominant exhibits of animals and habitats."

The other Chermayeff signature is that of keeping the crowd informed, entertained and, by all means, moving. "In Baltimore," he says, "we orchestrated the visitor experience in a linear path, like a musical piece, a book or a film. We carried people on travelators and escalators up to the top, gradually, through a central space, working upward, gallery by gallery, addressing habitats of the world, evolution and diversity of species. The humid jungle on the roof, flooded with daylight, bursts on the viewer with a kind of crescendo."

Another cinematic experience follows. The central core of the Baltimore building is a spectacular oval tank (to reopen soon, after a major renovation) containing the denizens of an Atlantic coral reef and the open ocean. The top section of this chamber is surrounded by a railing that evokes the deck of a ship somewhere at sea, with the moon rising on one side, the sun setting on the other, as rows of clouds kiss the horizon. Darkened ramps descend inside the giant oval with light shining through the water behind windows on all sides.

Dr. Joseph Geraci, professor of wildlife pathology at the University of Guelph, Ontario, is a consultant to both the Boston and Baltimore aquariums and has long advised Peter Chermayeff and his group on designing habitats for marine mammals. He says, "The public has no idea how much has to go into the making of a display to place the animals moving in front of them in a comfortable environment." The animals should be able to behave naturally and, in as many cases as possible, to breed. Temperature, habitat furnishings, daily changes in activity, feeding and light must be carefully planned lest the animals suffer debilitating boredom.

The life force of all aquariums is the water. No matter how they may look, these rivers, lakes, streams, oceans and ponds that contain the complexity and variety of life one finds in today's aquariums do not cleanse as they flow—as they do in nature with the aid of living plant life and sunlight to sweep away the nitrates of biological excretions. Aquarists are continually recommending adjustments to the engineers who run the pumps and computers that operate the life-support systems, almost as complex as any at NASA.

When it all works the results are wonderful. Touring the New England Aquarium with Peter Chermayeff, one sees that the boyish enthusiasm for this aspect of the life of the aquarium designer has never waned. He is delighted when Scott Dowd, a young aquarist, tells him that the fish in the flooded Amazon forest tank are now breeding. During high-water season in the Amazon, such fish forage around trees, roots and plants, eating nuts and fruits, seeds, grasses and insects like voracious rodents. Dowd has collected many of the specimens himself on annual tours to Brazil. "I lower the water-exchange level and turn up the temperature and lengthen the daylight in what would be the dry season, and turn on showers and feed them strawberries and grapes in what would be the rainy flood season. They have begun spawning." For aquarists, one criterion of a successful environment is that the species reproduce.

A spin-off company to do everything

The business is growing. With its network of marine biology and management experts, Cambridge Seven has frequently served as an adviser on start-ups, while it designed the physical plant. When the firm received a commission to design an aquarium within the old port of Genoa, Peter Chermayeff decided it was time to make advisory services a formal part of the business, so he started a new company called International Design for the Environment, Associates, or IDEA.

The Acquario di Genova was conceived as the Italian pavilion for Expo '92, a fair to celebrate the 500th anniversary of the voyage to the Americas of Genoa's most celebrated citizen, Christopher Columbus. To make the May 1992 deadline, the aquarium had to open prematurely, with only 6 of 30 major exhibits completed. In the late fall of 1992 IDEA withdrew. Subsequently, there have been accusations of embezzlement. Of an announced 1.8 million admissions, money for only 800,000 was accounted for. The mayor has since been implicated and has resigned.

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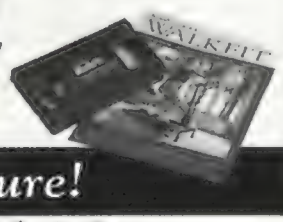

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While Genoa sits unfinished, other projects are moving ahead. IDEA and Cambridge Seven will build and manage the opening of a $64 million aquarium to be the centerpiece of Expo '98, Lisbon's world's fair, which will celebrate the oceans of the world and Vasco da Gama's arrival in India. The design concept, that the planet can be perceived as one world ocean, has been developed with four coastal biomes at the corners of a huge tank, all visually connected but also physically separated by acrylic. The roof will be suspended from masts by cables. Chermayeff describes the building as "both a man-made island in the sea . . . and a ship at rest, ready to set sail." IDEA is also hard at work on plans for aquariums in Germany, England and Colorado.

Closer to completion is a new center for the care of marine life in Seward, Alaska. Cambridge Seven is now codesigning the Alaska Sea Life Center, which will be much more than an aquarium. Construction will soon begin on a $46 million research and rehabilitation facility set in the heart of one of the richest marine ecosystems on Earth. Funded in part from a multimillion-dollar reparations payment for the *Exxon Valdez* oil spill, it will offer scientists a chance to study natural conditions in the Gulf of Alaska region and disturbances of all kinds, natural and man-made.

"At Seward," explains Chermayeff, "stranded animals and their rehabilitation habitat will be the dominant image in the design. The architectural built form will almost disappear. Walls and roof shapes will give way, for example, to a colony of sea lions on a rookery."

Joe Geraci is leading a drive on behalf of the New England Aquarium to develop a marine-life center on Cape Cod that will become an education and rehabilitation center for a wide range of stranded pinnipeds and cetaceans, from seals and sea turtles to pilot whales. "At last," says Geraci, who will serve as the executive director, "we will be able to study reasons why animals come ashore all along the New England coast."

For Peter Chermayeff, designing a center on Cape Cod to rehabilitate whales and return them to the ocean seems to close a circle, to fulfill a mission he began as a boy marveling at tadpoles in Cape Cod ponds. As he says, quoting T. S. Eliot, "the end of all our exploring will be to arrive where we started."

Rising above a shoreline park, the Chattanooga aquarium is a new landmark on the Tennessee River. Cambridge Seven trademark roof pyramids house a hardwood forest and a Mississippi Delta swamp.

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At Corps museum in St. Louis, Wayman Wells tries on uniform and hefts a canthook, a tool he used in an Arkansas CCC camp. Happy campers (opposite) truck off to work in California's Lassen National Forest.

By Donald Dale Jackson

They were poor, hungry, and they built to last

The 'boys' of the CCC worked for a dollar a day and 'three hots and a flop,' but monuments they made still stand today

"There were 30 boys from my county in Arkansas who went into the CCC the same day in 1936. We took a train west from Little Rock, and they called our names when we stopped at Clarksville. It was about midnight. They put us on a truck and hauled us to a camp in the woods at the end of a dead-end road, in rugged country. It just worried me. I was 17 and scared of most everything.

"The boys in camp came out in their skivvies hollerin' 'Fresh meat!' They meant us. We were all poor, hardly anybody had been away from home before. Three of the 30 ran off that night and never came back. They issued

us two dress uniforms and two work uniforms and two pairs of Army shoes, and that scared me too because it was more clothes than I'd seen before. And they said that if we lost any clothes our parents would have to pay, and I knew mine couldn't."

Wayman Wells, a 75-year-old retired machinist, smiled as he recalled the skittish teenager he was on that long-ago summer midnight he became a member of the Civilian Conservation Corps. But like every other CCC veteran I met on a swing through four states in search of them, he remembered with pride his time in what was arguably the New Deal's most popular agency: "I believe I'd be there yet if they'd-a let me," he allowed.

Wells and the other men whose lives were changed for the better by the experience are one of the great legacies of the program that began at the dawn of Franklin D. Roosevelt's first term in 1933 and persisted until 1942. Another is the work they left behind, a splendid heritage of parks, dams, bridges, buildings, roads, and hundreds of conservation and restoration projects in every corner of the country.

A third legacy is a group of current programs, mod-

eled after the CCC, in California (SMITHSONIAN, April 1983) and a number of other states, and in the federal AmeriCorps program, which over the next three years will put some 100,000 people to work doing everything from fighting forest fires to immunizing babies.

The original CCC got out of the blocks with what may be an all-time record for bureaucratic speed. Only 35 days elapsed between FDR's Inauguration and the enrollment of the first CCC boy—they were always called "boys"—on April 7, 1933. In that time, legislation was written, passed and signed, guidelines were set, campsite selection begun and, most remarkable of all, four Cabinet departments—Labor, Interior, Agriculture and War—were harnessed together to run the program. By July there were 274,375 boys in 1,300 camps.

To qualify, a boy had to be between 17 (18 at first) and 25 (28 later on), single, jobless, in good physical condition and needy. He signed up voluntarily at the local relief agency designated as the selection office. He enrolled for a six-month term, which he could extend for up to two years—longer if he was promoted to a leadership job. Five percent of the original 250,000 washed out in the first few months, most for refusing to work or going AWOL. Enrollees were paid $30 a month, $22 to $25 of which was sent home to their families. At its peak, in September 1935, the CCC mustered 502,000 members in 2,514 camps. Overall, 2.9 million served in nine years.

The Army built and ran the camps, which normally included four barracks with 40 to 50 men in each, along with a mess hall, recreation building, officers' quarters, a school for night classes, and a latrine and bathhouse separate from the barracks. The boys got up to a bugler's reveille, stood morning and evening formations, and showed up on time for meals or went hungry. When they trucked or trudged to work each morning, the Army bowed out and, most often, the U.S. Forest Service took over. Civilian foremen and "local experienced men," called LEMS, ran the work crews. Most of the work was manual labor; their tools were shovels and mattocks and sledgehammers, double-edged axes and crosscut saws. The bulk of the CCC's 200,000 black enrollees served in segregated companies. The rules were relaxed for Native Americans and for World War I veterans. The veterans were, of course, older men; and in the case of the Indians, the tribal council administered the projects, and enrollees were assigned to work in their own communities.

The average CCC enrollee, according to a statistical portrait compiled by the agency, joined at 18½, stayed in for nine months, and gained from 12 to 30 pounds and a half-inch in height during his tour. He had finished the eighth grade, had held no regular job before the CCC, and had three to four family members dependent on his paycheck. Sixty percent were from small towns or farms.

An enduring legacy: above, headquarters of Chippewa National Forest, Minnesota, among the largest log buildings in existence. Right, 6,000-seat amphitheater at Mt. Tamalpais State Park, California, built of stones weighing as much as two tons each. Opposite, an elegant boathouse, built from local limestone, stands above a 135-acre, CCC-made lake in Strawberry Point, Iowa.

My interviews and research on CCC vets led me to add a few wrinkles to this portrait: I found that as a group they were obedient, patriotic (nearly all had served in World War II), resilient, grateful for the chance ("but I enjoy it more now than I did then," one said) and, to a man, convinced that the CCC is just as good an idea today as it was in 1933.

But if the CCC was a lifeline for the undernourished sons of the Depression, it was a boon of another kind for the country at large. CCC veterans have only slowly come to realize that the work they performed to help their families survive produced a national treasure of fine and lasting structures.

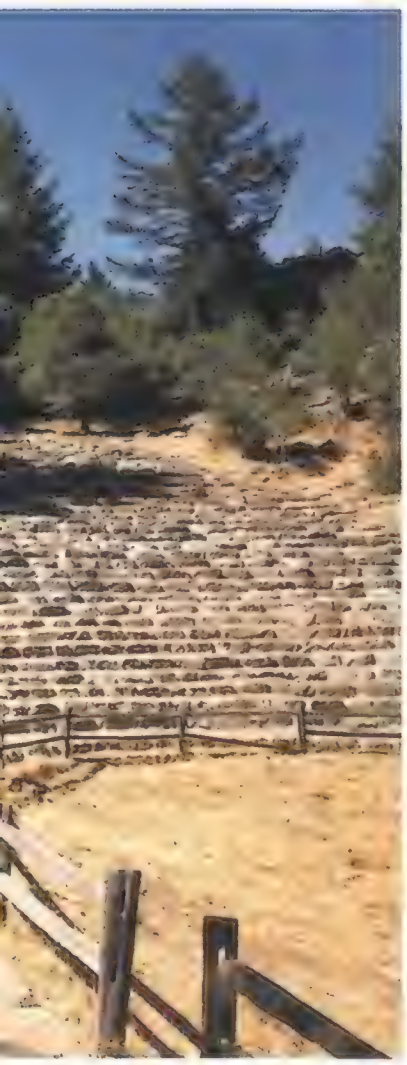
The masonry dam and bridge at Cumberland Mountain State Park near Crossville, Tennessee, built with hand-hewn sandstone, is a graceful yet solid edifice reminiscent of a Roman aqueduct (p. 78). "I've met three old boys who claim they built that dam by themselves," Wayman Wells joked. The red pine log headquarters of the Chippewa National Forest in Cass Lake, Minnesota, one of the largest log buildings anywhere, is a masterpiece of precisely notched and grooved logs. The magnificent amphitheater at Mt. Tamalpais State Park in California, modeled after a Greco-Roman theater in Sicily, contains 5,000 stones weighing more than 600 pounds each. The limestone boathouse at Backbone State Park in Iowa, a delicate building with intricate and playful stonework, stands guard like a miniature castle over a CCC-made, 135-acre lake.

Robert Ritchie, a CCC vet from Hansell, Iowa, who worked at Backbone Park, expressed the late-blooming pride that many veterans share: "I thought of the C's as just a phase in my life, but as you go on, you feel that it, that you, were a part of the country and of history. We have this park; it was wilderness before, and now it's a nice place to go, and I had something to do with that. I was part of an important event."

Life in the CCC, with such niceties as three squares a day, indoor plumbing and electricity, was a step up for many boys from destitute rural families. "It was better than what I was used to," Clinton Boyer of St. Louis said. "At home we had no running water and used oil lamps." Lonnie Goddard of Bradley, West Virginia, recalled making a single egg do for two meals on his family's Appalachian farm. "I'd have the white for breakfast and put the yellow on corn bread for lunch at school."

Goddard's most vivid memory of the CCC is the careless waste of food. "I was on KP the first weekend I was in, and we had weenies in bread dough, but only about half the company was there and we threw a lot of it in the garbage. I was thinking about the people who could use it, like my family."

These were boys whose horizons were pinched by poverty. Doyle Jones of Jamestown, Tennessee, recalls



"The kitchen was enough to keep me happy," says one CCC veteran about the good and plentiful food served in the camps during the Depression. Here, a crew chows down in Montana's Lolo National Forest.

every detail about his train ride to CCC camp because he'd never made a trip like that before. "They took us on the Southern Railway to Knoxville and then by the Louisville and Nashville to Chatsworth, Georgia. I recollect it even now because there wasn't much going on in my life at the time." At camp, Jones was startled to find such exotic foods as bananas and oranges on his tray. Jones' family used his $25 monthly allotment to pay off their grocery bill. "Kirby Johnson at the store, he'd just subtract $25 from what they owed."

They remember the food with a fondness born in deprivation. "Oh, they really fed us, especially breakfast," recalled Harry Marsanick of Florissant, Missouri, "ham and potatoes and sausage, all the eggs you wanted. The kitchen was enough to keep me happy." Slumgullion and the dish known to generations of servicemen as "SOS" were staples, along with fish on Friday and chicken on Sunday, and it was all fine with them. "Bread on the table, that's what it was about," said George Legg of Oak Hill, West Virginia. "Warm clothes and your own bed. It was three hots and a flop."

In 1942, when CCC funding stopped and most of the boys had changed to other uniforms, the agency issued a report summarizing its accomplishments. The numbers on the volume and variety of work were awesome: 46,854 bridges of various kinds built, 3,116 fire-lookout towers, more than 28 million rods of fencing, 318,076 "check dams" for erosion control, 33,087 miles of terracing. CCC lads fought forest fires and mosquitoes and soil erosion, they planted trees and grass, and excavated channels, canals and ditches; they laid pipe and improved wildlife habitat and built or maintained thousands of miles of hiking trails. They did every conservation job that any land manager could think of. And some died: there were accidental drownings and falls; 47 were killed in forest fires; nearly 300 perished when a hurricane flattened three camps of war veterans on the Florida Keys in 1935.

Their foremen used blueprints for major jobs like the Crossville Dam, but they often worked without plans because plans were paper and paper meant more military involvement. "A lot of times they didn't have plans," said Michael Pierce, director of the CCC's St. Louis-based alumni organization. "Plans would bring the Army in, which meant nitpicking, and they wanted to keep the Army out as much as they could." In extremely cold or stormy weather they stayed in camp. "We didn't go out if it was colder than 5 below," Robert Ritchie of Iowa recalled. "We had three weeks like that once. The guys sat around making cigarettes with their machines."

They went to work at 7:15 and quit at 4, with a break for lunch served back at camp or trucked to the site. "They brought lunch in big old kettles, and we'd eat the beans and applesauce all slopped together in our mess kits," Lonnie Goddard remembered. The work was tough. "I filled holes in a road," said Burl Hutchison of Columbus Junction, Iowa. "My station was the business end of a wheelbarrow or shovel. We called the wheelbarrows 'silver streaks' or 'Irish buggies.'" Goddard quar-

Frequent contributor Jackson has logged many miles on CCC trails in the national parks and forests.

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Nearly 200,000 African-Americans, like this clerk at a camp headquarters in Gettysburg, served in the Corps.

Trucks stood tall for inspection at a Minnesota camp. Boys learned maintenance, washed engines weekly.

ried and set sandstone. "We'd blast it and then split the rock into smaller chunks with hand tools and load it on trucks with a hand crank." His proudest accomplishment was a stone wall in a state park. "We dug footings and filled them with stone to a depth of 17 feet. Seventeen feet! Do you believe it? And it was beautiful."

The lucky ones learned about craftsmanship. Arthur Jackson, who later owned a successful drilling company in Lebanon, Tennessee, cut blocks of sandstone for the Crossville dam. "It was amazing what the engineers could do with a bunch of ignorant kids," he recalled. "They were patient. They said we were going to do it right, and if you rebelled you got another job. They only wanted boys who were willing to learn."

The CCC boys were civilians, but G.I. discipline governed their camps. "When I first reported, the officers asked me some question and I said 'Yeah,' and they shouted 'What did you mean, Yeah?'" Burl Hutchison of Iowa remembered. "They wanted a 'Yessir,' and I was thinking, 'Oh my, what did I get into?'" "They had a bugle or a whistle for everything," Lonnie Goddard said, "and I was used to roosters and not a bugle waking me up. You made your bunk with six inches of white below the pillow, and everything had to be just so in your foot locker. If you threw your cigarette on the ground you wore a butt can around your neck for a day."

"I laugh whenever I remember that"

They had to shave, bathe regularly and keep their hair short. Though the regimen varied with the camp commander, enrollees often had to salute officers, and bed checks were common. Toward the end of the CCC's existence, with war coming on, they learned close-order drill. But there were some who never quite fathomed the military mind. "The captain asked some of us one time if we wanted to work in the kitchen," Doyle Jones of Tennessee said, "and this one boy—he was always a puzzler, he thought about things—he said, 'Well, I haven't *fully* made up my mind.' I laugh whenever I remember that. The officer just looked at him and said, 'Well, I have, you're not a-workin' in the kitchen.'"

Camp canteens sold candy, soap, cigarettes and sometimes beer in exchange for chits from canteen books the boys bought for a dollar. Every camp had a sports program, invariably including baseball and boxing and sometimes basketball; 20 CCC boys were signed by major league baseball scouts, and future Hall of Fame infielder Red Schoendienst served in a CCC camp in Illinois. There were libraries and night classes—though education was never considered to be the CCC's most successful undertaking, it became a more important goal as the program evolved. Everything from elementary school subjects to vocational training and even etiquette was taught in the camps. Nearly 8,500 CCC

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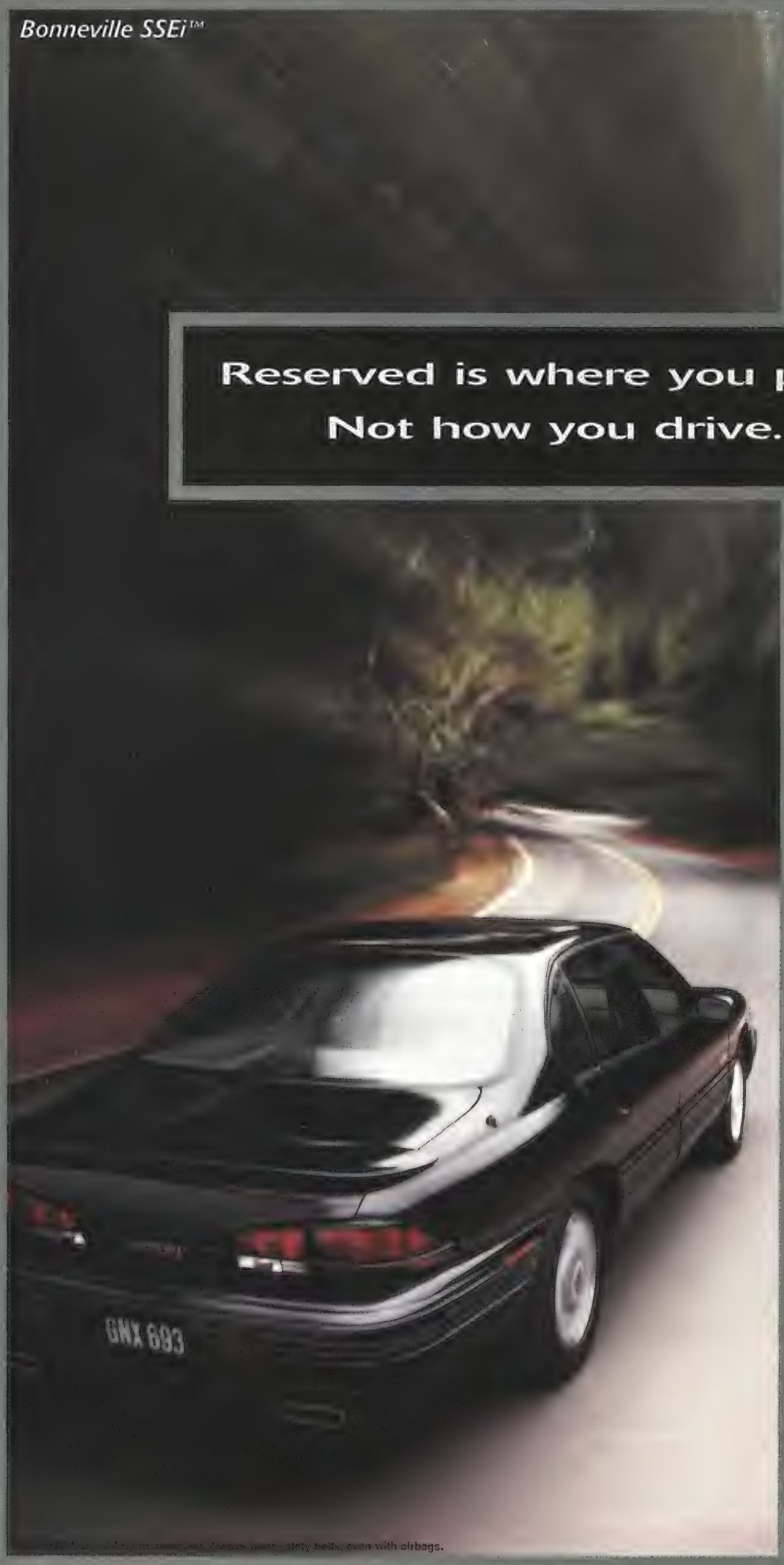

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At camp canteens like this in Washington's Mt. Baker National Forest, boys could buy soap, candy, cigarettes and sometimes beer. But most of their pay was sent home to help with family finances.

boys learned to read and write in fiscal year 1938-39.

Military doctors were assigned to each camp or group of camps. "Ours was a veterinarian, old Doc Briggle," Robert Ritchie of Iowa said. "He had one treatment, a fruit jar full of 'physic' pills about the size of a pea. If you broke your leg that's what you got." Arthur Jackson of Tennessee went on sick call with the flu, and the doctor gave him Epsom salts in a cup. "He said it's to discourage goldbricking. It liked to kill me. It ruined me for cups, I'll say that; I still won't drink water from a cup."

Practical jokes were a CCC tradition. New arrivals were dispatched to "water the flagpole." There were dozens of variations on the "snipe hunt": rookies raced off in quest of "striped paint," "bunk spacers," "sky hooks" and other imaginary objects. It was a simpler time: they gleefully short-sheeted one another's beds and tied neatly folded clothing in knots—"that would kind of disappoint you, especially if it was 15 minutes to reveille," said Burl Hutchison.

They concocted their own slang. A cigarette was a "stiffy," its makings, tobacco and paper, were "sawdust and blankets." The officers' orderly, who delivered meals to the brass, was known as "Dog Robber" because he got the choice leftovers the dog might otherwise have enjoyed. If you wanted something at the end of the mess table, Lonnie Goddard remembered, you called out "Butts on the beans!" or whatever it was, and you finagled a drag off another's cigarette by crying "Butts on that cigarette!" In the evenings they played cards or Ping-Pong or music. Guitar picker Doyle Jones joined a band that played for local square dances, while Wayman Wells recollected Arkansas as "harmonica country—those boys could wear a harmonica out."

The rules prohibited the boys' owning a car, but many officers looked the other way as long as they parked the car elsewhere. "I kept my Model T a quarter-mile away on a farm," Robert Ritchie said. "For a dollar a month the farmer let me put it in a corn crib out of the weather." He and other car owners ferried their friends home weekends for a fee, one of several money-making hustles that flourished in the camps. Wayman Wells bought $1 canteen books at a discount from boys who needed money, then resold the books at face value. He also sold suits for a company that gave him one free for every four he sold. Arthur Jackson cut hair for a dime a head. Robert Ritchie made more as a loan shark than he collected from the government and spent it all on shirts, pants and underwear. When he got out he owned three foot lockers full of underwear.

CCC boys were by and large neither rebels nor troublemakers; they had chosen to be there, and most accepted the discipline and hard work. But from the beginning there were some who did not, and there were occasional uprisings if not full-scale mutinies. Desertion, always a concern, accounted for 11.6 percent of those leaving the corps in 1937, and the percentage increased in later years. A boy was counted a deserter if he was AWOL for eight days. Nobody pursued them, but Harry Dallas of Overland, Missouri, ran into an ex-enrollee 58 years later who was worried that they might still be looking for him. Most deserters left in the first few days, often out of homesickness.

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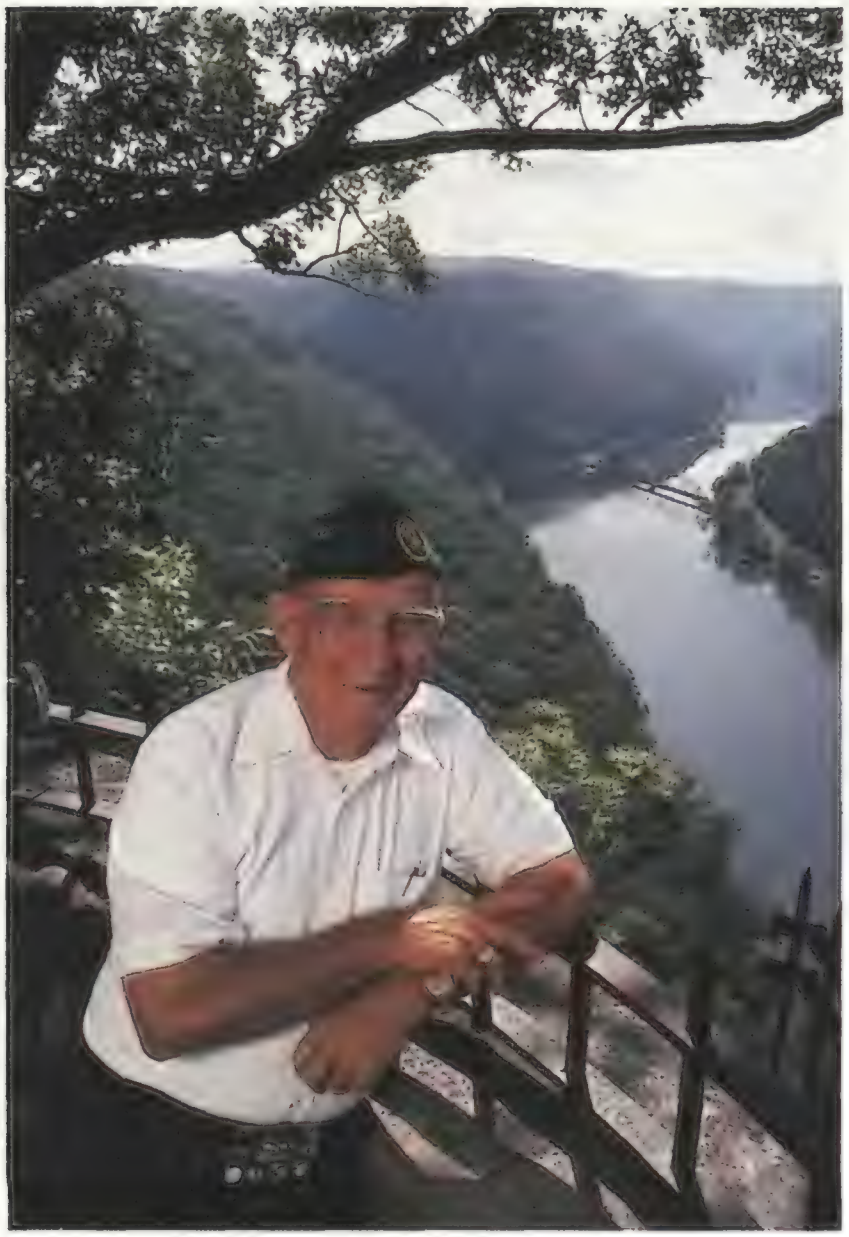

At Hawk's Nest State Park, West Virginia, Lonnie Goddard revisits a scenic overlook he helped to build.

They staged work stoppages and food strikes to protest curfews, cold-weather work and the quantity or quality of the food. In Wayman Wells' Arkansas camp the issue was neckties. "We wore wool uniforms and neckties for retreat review in summer when it was real hot, and they checked to make sure our ties were tight. Well, we called a food strike and nobody ate supper for three days. The doctor got into it, and they finally said we could unbutton the top button of our shirts and wear the tie loose."

The real conflict was not between CCC enrollees and the military but between the boys from the C's and townfolk in nearby communities. Some towns posted "No CCC Allowed" signs. "I think people in general looked down on us," Carl Denoff of Lansing, West Virginia, said. "It was like we were trash, we weren't recognized as equal. But when we'd pass farmhouses on our way to town the girls would holler and wave." On weekends they rode to town, where they sometimes scuffled with the local boys. "That's what bound us together," Lonnie Goddard said. "If the boys in town jumped you they'd have to whip all of us. We were like brothers."

If a CCC boy acquired a girlfriend he could escort her around town, but bringing her back to camp was a no-no, except at chaperoned functions. The boys in Robert Ritchie's Iowa company had nicknames for the girls. "A redhead from the town of Strawberry Point, we called 'the Strawberry Roan.' I was at a CCC reunion not long ago, and I mentioned that, and this woman sitting a few seats away heard me and piped up, 'That was me.' She'd married a CCC boy."

"We don't cotton to your kind"

Hundreds of other marriages resulted, but relations between CCC lads and local girls also left a truckload of sour memories. Harry Dallas of Missouri was seeing a girl until "a car drove up to camp and her mother got out and gave me a lecture: 'I don't want my daughter associating with your type. We don't cotton to your kind.' I never saw that girl again." Wayman Wells and his friends found a novel way to fight back. "They had pie suppers in town. You bought a pie, and the girl who baked it sat with you, but the girls wouldn't sit with us. They always had a vote for the prettiest girl, you know, so we ran one of our guys, Leon Ogden, and there was enough of us that we won. He got the prize as prettiest girl. We called him 'Sis Ogden' after that. But that broke the ice. Pretty soon we started dating town girls."

Ask a CCC veteran what he got out of the experience and invariably his first response is that he learned to "get along with other people." But this doesn't mean an appreciation of ethnic or cultural diversity, it means something much simpler: this was often the first time they had been *anywhere*; the CCC was their first exposure to life beyond home, farm, village and schoolhouse. One camp's slogan was: "Join the CCC and see the world, a shovelful at a time"; the CCC was their first narrow glimpse of how many shovelfuls there are.

Most of them learned important lessons as well. "Discipline, that was the key," Harry Dallas told me. "You agreed to do something and you did it. I learned a work ethic, how to do things safely and right. Whenever I see that CCC postage stamp, you know, the one with the CCC boy carrying that pickax on his shoulder, it bothers me because that was unsafe—we learned not to carry them that way. You could turn and knock somebody in the head. There was pride in the work. We built something, and I knew I helped and I saw the result. It was something you could take pride in, and there wasn't a lot of pride available in those days."

Often enough, the CCC transformed shy, backward country boys who thought of themselves as losers into physically stronger, effective men. Self-esteem, we call it today. "I felt I was going downhill, like the CCC was the bottom of the barrel," said Robert Ritchie, "but I wasn't

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alone, and I came out positive, more positive as time passed." "I was scared to death of everything," Arthur Jackson of Tennessee recalled. "Just timid. I didn't think I could talk to people. I'd only gone to third grade. The C's gave me confidence that I was as good as anybody. It made me know I could do things, gave me some push. I'm proud that I worked on that Crossville dam. I wasn't afraid to tackle anything after that."

When CCC vets go in search of their old camps, as many of them have done, what they find is weeds, trees, an occasional cement foundation slab—nothing that looks familiar, nothing to mark their passage. The Army broke down the prefabricated buildings and hauled them away soon after the CCC expired in 1942. Most veterans react as Harry Marsanick did when he revisited the site of his camp in Missouri: "I was surprised. I was there 15 months, and it was like it never happened. I thought there would have been something there."

The men I interviewed were unanimous in their belief that the CCC was positive for them and the country, and they think it would work again—as indeed it has in CCC-like state programs and in small-scale federal models. "So many crafts don't have apprenticeships nowadays," Wayman Wells said. "A new CCC could restore them." "Think of all it might do," Harry Dallas added. "The roadside car junkyards, for example. They could clean all that up." Many veterans have doubts about whether today's young people are as hungry or as willing as they were, and most realize that this generation grew up in an America that survivors of the 1930s can barely recognize.

Still, they hanker for tribute, for recognition of the CCC's success. Veneration, appreciation, respect—they want what our fathers and grandfathers always want. Today there are a few scattered CCC museums, a restored camp in northern Minnesota, a statue in Los Angeles, and those glorious monuments in wood and stone. That and their memories.

Perhaps, in the end, that's enough. "I tried to find my camp at Crossville," Arthur Jackson said, "and I couldn't locate a trace of it. But that's all right. I can still picture it in my mind, and I know what we did was lasting, and that's what matters. It's not a sign or a marker or a camp, it's what we did that counts."

Graceful bridge and dam in Cumberland Mountain State Park at Crossville, Tennessee, is 347 feet long, the largest masonry structure the CCC built. With no reinforcing steel, it is evocative of a Roman aqueduct.

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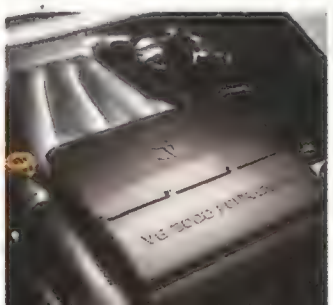

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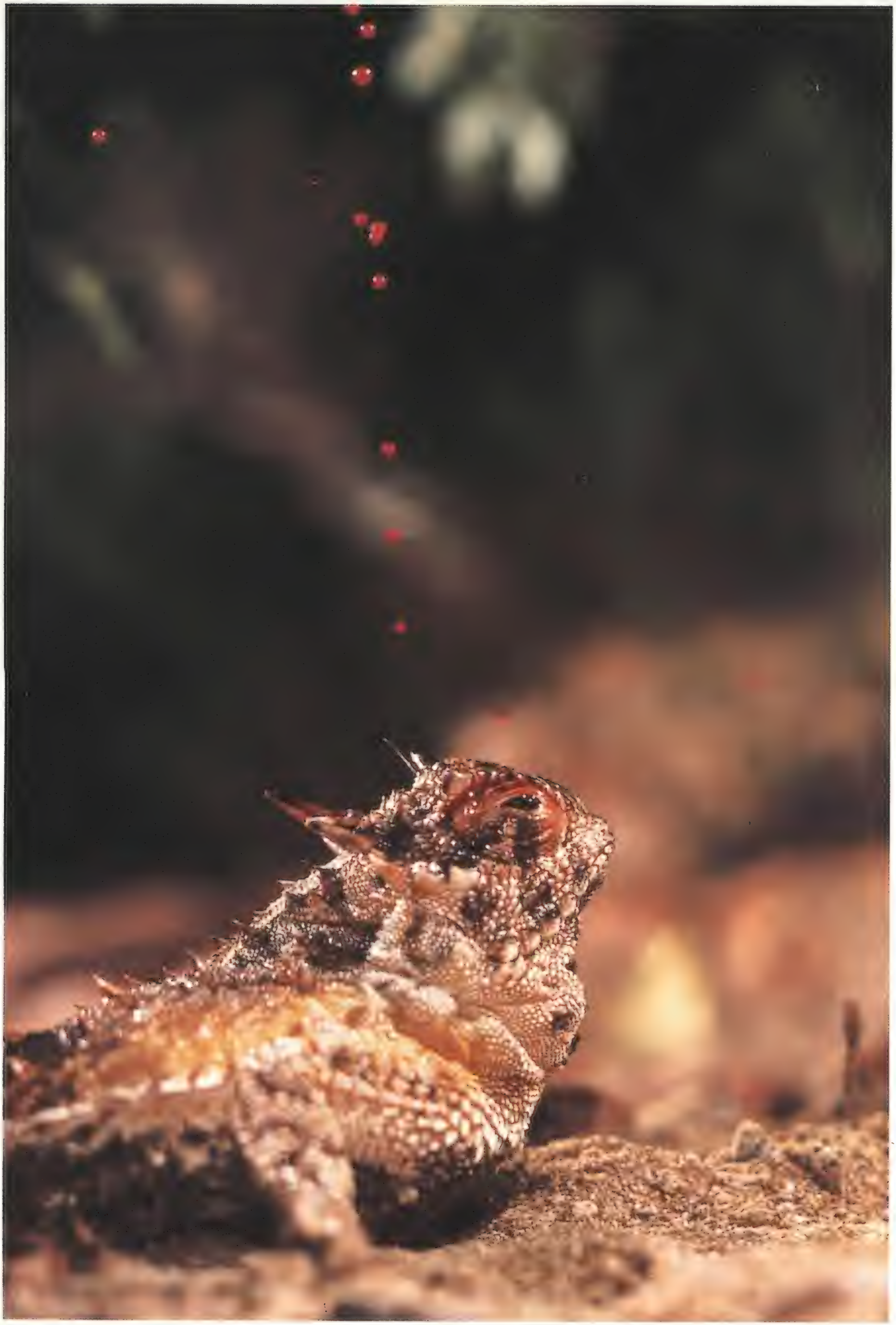

By Susan Hazen-Hammond

'Horny toads' enjoy a special place in Western hearts

Actually lizards, these armored anteaters rarely exceed five inches, but they're not easy pickings: pressed, they fire jets of blood

It was 7 P.M. on a June day, and the sun that had roasted the chaparral of South Texas all afternoon had finally shifted far enough to the west so that the temperature had dropped from 110 degrees F to 97. Creatures that had been trying to stay cool in the shade or beneath the dirt since morning were reappearing among the mesquite trees, barometer bushes and pencil cacti. Melisa Montemayor, a biologist at the Chaparral Wildlife Management Area, and I pushed our way through the dense, thorny brush to a small clearing. That morning we'd seen some baby horned lizards, or "horny toads," as most people call them, skittering through the shadows before they burrowed into the dirt to escape the afternoon heat. But now, as carefully as we looked among the rocks, dead leaves, mounds of earth and twigs on the reddish, hard-packed dirt, we simply could not find them.

Suddenly a "rock" the size of a quarter scurried past on four tiny feet. Then what looked like a shadow-patterned leaf stepped forward and bobbed its head up and down. An ant passed, and a creature our eyes had taken for a blotched mound of colored earth, stippled by light and shadow, flicked out a tiny tongue and snapped up the ant.

They were more baby horny toads. Their shape, stance and coloring had camouflaged them so well that we couldn't see them until they moved.

Melisa picked the tiny lizards up, one at a time, and studied their feet. "None of their toes are clipped," she observed. "These aren't even the same ones we found this morning."

She handed one to me. It looked like a miniaturized dinosaur. Horns emerged from the back of its head and protruded from its cranium, above its eyes. Bumps on its rough back were already beginning to transform into fleshy, predator-repelling thorns. Low on its wedge-shaped face, a row of scales formed tight-pressed lips that seemed to frown from ear to ear.

Like other babies from those species of horned lizards that hatch from eggs, the lizard in my hand would never know its mother and would probably never know any kind of physical closeness to other horned lizards except during mating and the occasional lingering afterplay. But the lizard pressed its smooth belly against my palm as if cuddling were its favorite activity. And when I turned it over, the lizard reared up on its elbows and looked at me with the wrinkled demeanor of an inquisitive old man. As it breathed steadily in and out, its respirations matching mine, the years disappeared and I was 6 years old again, a scruffy kid in the brush country of eastern Washington State, giggling as a horned lizard warmed itself in my hand.

In spite of their common name, horny toads are lizards, not toads. Eons ago, about four ice ages back, horned lizards evolved in North America, and even today they are native only to a large swath of land that stretches from southern British Columbia down to northern Guatemala.

Like sagebrush, cacti and dry air, horned lizards have become a symbol of the arid West, where nature seldom nurtures and no creature survives that cannot adapt. Perhaps because horned lizards seem simultaneously so fierce, tender and mysterious, residents and travelers in the West have marveled at them for hundreds, even thousands, of years. Although horned lizards account for only about a dozen of the 3,300 species of living lizards, probably more Americans have interacted with horned lizards than with any other kind.

Ancient Indians in the Southwest painted pictures of them on their bowls and pots. Early settlers and explorers mentioned the ferocious-looking animals in their journals and reports. Ignaz Pfefferkorn, a Jesuit who lived in southern Arizona and northern Sonora, Mexico, in the mid-1700s, typified the way people respond emotionally to horned lizards when he wrote indignantly, "There are people who erroneously accuse this innocent animal also of being a murderer." As proof of their innocence, Pfefferkorn reported that he had often seen Spanish colonists and Indians hold a horned lizard in their hand "without experiencing the least injury. The

Forced to use its ultimate weapon, a horned lizard can squirt blood at an adversary from a place near its eyes.

It looks aggressive, but this desert dweller is only gaping and holding its body off the hot sand.

Inflation is another defensive tactic, one that makes the animal appear larger and emphasizes its spines.

Can you spot the horned lizard at center right? Lizards can change color to match their surroundings.

animal sat quietly and was so tame that it allowed itself to be stroked softly."

Earlier in this century horned lizards, which have been called both "thumb-size dinosaurs" and "dwarf dragons," were often sold as souvenirs to tourists or shipped like toys across state and national boundaries. Since people didn't understand their habits or their needs, the captives usually died.

Today that practice is illegal, and the "bizarre" animals, as even scientists have called them, still scuttle through the brush and across backyards in 20 Western states, delighting children and causing normally solemn adults to chuckle at their antics.

That morning in the chaparral, I set the baby gently back on the ground. It puffed its body up with air in a display of ferocity clearly directed at me. Then the brush stirred and a roadrunner appeared. The lizard darted across a patch of sunlight and flattened itself into a shadow beneath a lotebush.

Melisa and I blinked—and the lizards seemed to vanish. Once again, our eyes and brains discerned only leaves, twigs, rocks and earth; the horned lizards had become like the hidden patterns in an M. C. Escher print. The roadrunner looked meaningfully at the lotebush, then pranced on.

Melisa wiped the sweat off her forehead and laughed. "This is why it's so hard to study horned lizards in their natural setting," she said. "They're so elusive. For every one we find, there may be a dozen we don't see." It's also why, after three years of study, her team can only estimate the number of horned lizards in the 15,000-acre chaparral preserve. So far they've marked, catalogued and released 600. "But I think we're going to find that the actual density per acre is a lot higher than we've ever imagined."

Biologists and taxonomists distinguish the species of horned lizards, which are all members of the genus *Phrynosoma*, from one another by small differences in the fringes of scales along the sides of their abdomens; the blotches of color and stripes on their backs; and the length, curvature and placement of their horns. But all horned lizards have much in common.

Susan Hazen-Hammond writes from Santa Fe on the Southwest. Her latest book is Chile Pepper Fever: Mine's Hotter than Yours *(Voyager Press, 1993).*

Odd body shape and irregular outline (broken up by thorny or fringelike scales) make them hard to see.

Roadrunners have learned to swallow horned lizards headfirst and belly up, to minimize effects of horns.

This Western diamondback was not so skilled: it and the lizard were both dead and dessicated when found.

Like other reptiles, they are ectotherms, whose body temperature rises and falls with the temperature of their environment. This efficient system of heat control allows them to survive on about one-thirtieth the amount of food that an endotherm of similar size—a small bird, for instance—would require, but it also creates problems.

Horned lizards have to cope with summer days so hot the sun could kill them, and with winter nights so cold their body processes could slow until they were defenseless. Just staying in the sun too long, even on cool days, could deplete their energy reserves or alter their reproductive cycles.

Belowground each night, each hot afternoon and each winter, they have to extract air through the soil without inhaling particles of dirt, and they have to be able to expand and contract their lungs without having to push the earth upward with their small backs each time they inhale.

Because water is so scarce, they have to catch rain as it falls. And above all, they have to avoid numerous potential predators many times their size.

To accomplish all this, horned lizards have developed a remarkable physiology and a complex set of behaviors. A "third eye" on the top of their heads, the sightless pineal eye, tells them when they've had enough sun. To regulate heat intake, they lighten or darken their skin. Or raise and lower their abdomens in relation to the ground. Or move from sun to shadows and back. Or they may flatten or narrow their backs to increase or decrease heat absorption.

To dig into the ground, horned lizards sweep their faces briskly back and forth against the dirt like whisk brooms. Underground, their nasal valves contract the nasal openings to slits so small that dirt can't pass through. Then they shift their bodies to seal the earth and create a small cavity beneath them, allowing them to expand and contract their lungs easily. When they poke their faces out of the ground each morning, they use sphincter muscles to control the blood flow in their heads, so that they can warm their brains first and quickly grow alert. When they loosen the sphincters, warmed blood rushes into the rest of their bodies, and they're ready for the day.

To harvest rain, a horned lizard raises its abdomen, splays its legs and flattens its back. The raindrops that beat on its scaly skin get caught between the scales, then

The third, or pineal, eye on top of its head is visible in this portrait of a regal horned lizard. Most herpetologists believe the eye serves as a sun sensor, telling the animal when it has had enough exposure.

flow forward toward the head, carried by capillary action. The lizard lowers its head, opens its jaw and drinks the water sliding off its back.

Horned lizards do all this and more without acting territorially toward their fellow horned lizards and without establishing social hierarchies. When two species overlap in the same environment, one may shift its eating habits so that it doesn't compete for ants, the horned lizard's favorite food.

Wade C. Sherbrooke, director of the American Museum of Natural History's Southwestern Research Station in Portal, Arizona, has been studying horned lizards since the 1970s. As a graduate student, he spent summer after summer lying on the desert floor and peering through a makeshift blind—a cardboard refrigerator box with a slit in it—observing horned lizards in their natural setting. He also collected them each spring, after they emerged from their winter's hibernation, to study their behavior in a controlled environment.

"Horned lizards are so distinctive that if I took one specimen from every species of lizard in the world, and asked the average person to pick out the horned lizards, he'd probably be able to do it," Wade told me.

Wade loves to ponder the possible reasons behind horned lizard behaviors, like the question of why they sometimes swallow small pebbles. To grind their food? To rid them of parasitic nematodes? To add minerals to their diet? "Perhaps it's all three." He has also analyzed the ways in which horned lizards have evolved habits and lifestyles similar to their closest look-alike, a genetically unrelated lizard in Australia called the thorny devil. But most of all, he enjoys examining how horned lizards deal with predators.

One afternoon, as we scooped shovelfuls of dirt swarming with ants from a desert nest to take back to the captive horned lizards at the station, Wade said, "Animals typically have three ways of avoiding predators. They can avoid being seen. They can outrun predators, and they can actively resist predators." From an evolutionary standpoint, horned lizards, with their almost clumsy bodies, have sacrificed the option of outrunning predators in order to make an art of crypticity and resistance.

The interrelationship of diet, body shape and color, and defensive behavior of horned lizards has also been detailed by Prof. Eric Pianka, the dean of desert lizard ecology, at the University of Texas at Austin. The lizard's diet is almost entirely ants, and ants are not only small but also consist largely of undigestible chitin. So horned toads have to eat a lot of them. They have a very large stomach for their body size and thus a tanklike form, explains Pianka. This in turn means they are not very fast, so they have to use other strategies to escape predators. That may explain why the lizards have evolved cryptic behavior, such as gradually changing color to match their background, as well as the row of horns that makes swallowing them a real problem for most animals that do find and catch one.

The inability of horned lizards to escape by running has another consequence, Pianka says. Females of some

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A male Texas horned lizard holds a female by one of her horns as they mate, behavior seldom seen.

A female regal horned lizard swings her head back and forth to dig a chamber in which to lay eggs.

This recently hatched Texas youngster will be easy prey until it matures and grows its namesake horns.

species produce very large clutches of eggs, at times reaching 35 percent of their total body weight. Because they will rarely run, there is no reason not to weigh themselves down with eggs. Crypticity and spiny armor again help the female avoid predation.

The blotches of color on a horned lizard's back aid in the crypticity that Melisa and I had witnessed in the Texas chaparral. The midline stripes, sometimes light, sometimes dark, that run down the backs of several species help confuse the eyes of potential predators, just as they did ours. Even the light-colored fringe that borders the abdomen of most species helps break up, or "erase," its outline.

But sometimes predators still spot the diminutive horned lizards, which seldom grow larger than five inches from snout to vent, the horizontal opening on a horned lizard's lower belly through which it copulates and excretes wastes. In observing horned lizards with kit foxes, rattlesnakes, grasshopper mice and other predators, Wade found that horned lizards hissed, jumped and raised their horns like little bulls. (This last behavior might explain their common name in some parts of Mexico and the Spanish-speaking Southwest: *toritos de la Virgen*, "the Virgin's little bulls.") Predators that dare swallow a horned lizard may die from puncture wounds.

But the behavior that has fascinated Wade most by far is the horned lizard's ability to squirt blood. "Biologists have known about blood squirting in *Phrynosoma* for more than a century," he told me. "But so few people have seen it that many nonscientists have continued to consider it a myth."

I could understand why. In all my years of playing with horned lizards as a child, and in the dozen summers during which I had watched the short-horned lizards—the most widespread horned lizard—in my backyard in Santa Fe, New Mexico, I'd seen a lot. I'd seen one open its mouth and charge a neighbor's cat, making the cat back down. Another played dead, lying lifelessly until the cat lost interest.

I'd seen horned lizards, when they first emerged from the ground in the spring, almost too weak to move, sit and wait for energy-restoring food—ants—to come to them. And I'd seen ants mistake the earth-colored lizards for rocks and march right over them. Once a horned lizard panicked when overrun by too many ants—as delicious as ants might taste, they can also bite and sting.

I'd seen young lizards take on the coloration of their surroundings, gradually, over days or weeks, growing redder in the parts of the yard where red rocks prevailed and yellower where the earth had a yellowish cast. One July afternoon I saw a mother short-horned lizard, the only U.S. species that gives live birth, stand on a high patch of ground and watch like a playground su-

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Newly emerged, lizard will hold blood in its head until sun warms it up, then release blood to its body.

pervisor as her purple newborns tumbled around the yard, trying to learn to walk.

Once, in Arizona, I'd even seen a round-tailed horned lizard turn instantly from black to white. But in all those years, I had never actually seen a horned lizard squirt blood. Wade demonstrated this truly bizarre behavior for me, using methods that I will not describe lest some younger reader be tempted to try. As certain TV commercials conclude, "Do not try this at home."

When the creature is threatened by a large predator, it runs through an elaborate behavioral repertoire. First, the lizard will hiss and swell its body with air. If that doesn't work, the animal will flatten its body into a dorsal shield and tip it up toward the attacker. The predator may decide that this little animal might just be too difficult to swallow.

When all else fails, however, the lizard's eyelids will suddenly swell shut. A hairlike stream of blood comes shooting out from a tiny opening near the animal's eyelids, to be shot point-blank at the aggressor. The blood must contain noxious compounds because it clearly repels the recipient. Then the eyelids shrink back to normal size, and the horny toad—its own cheeks streaked with blood—will look around with what at least one human observer saw as a triumphant expression.

Horned lizards seldom shoot blood at any predators except large mammals. Mostly they squirt canids: coyotes, foxes, domestic dogs. Wade and his collaborator on blood-shooting studies, George A. Middendorf III, hope scientists will soon identify the factor that canids find so repellent. Perhaps shepherds could spray a synthetic version on sheep to drive off coyotes. Or mail carriers might carry canisters of eau de horned lizard blood to ward off aggressive dogs.

From Portal, I drove west through the Sonoran Desert to Yuma, where Wendy L. Donaldson was studying the range and habitat of the flat-tailed horned lizard for the Arizona Game and Fish Department. The rarest of all U.S. *Phrynosoma* species, the flat-tailed horned lizard occurs only in a small corner of Arizona and California, primarily in the region of the lower Colorado River that extends into Mexico.

Using a portable scale, Wendy weighed a flat-tailed horned lizard we had found on the road. Then she handed it to me. The air temperature was 104 degrees F that morning, but there was nothing visual about the horn-studded lizard in my hand that would have told me this species thrives at temperatures higher than other horned lizards. A dark line ran down its back, and the brown circles, rimmed with yellowish green, on either side of the line made the sand-colored animal look like part of a dried plant, even in my hand. Its broad, flat tail reminded me of the ancient tail tracks of long-extinct reptiles I had seen in fossil fields. As I shifted around to the patch of shade cast by the pickup's cab, the lizard swiveled its head to keep its dark eyes on me and tilted its long, sharp horns, as if to remind me of the consequences if I tried to swallow it.

Wendy set the lizard back on the sand. The ground temperature in the sun had reached 130 degrees F, and the lizard hurried off into the shade. "To me, horned lizards are the pandas of the reptile world," Wendy said. "They're cute. They're cuddly. I don't know anybody who doesn't like them. That means they can be used as a tool to remind us of our impact on the world around us. That may be the most important thing of all."

The threat of the inadvertent predator

As with so many other animals, the biggest threat to horned lizards has become humankind. Inadvertent predators, we build houses or pave over empty lots where horned lizards live. We smash them with the wheels of our vehicles. We build highways, pipelines and canals across their habitat. We poison ants. We turn parched wilderness into irrigated farmland. And most of the time when we do, horned lizards—just like all those other animals—lose.

In November 1993 the U.S. Fish and Wildlife Service proposed the flat-tailed horned lizard for listing as a threatened species. The Texas horned lizard has been listed as threatened in Texas, and the coastal horned lizard of Southern California has also been proposed for threatened status.

Saving horned lizards is the number-one issue of the four-year-old Horned Lizard Conservation Society. Many of the 400-plus members, who live in all parts of the country, favor reintroducing the lizards in places like eastern and central Texas, where they are disappearing. Others argue that good intentions often pro-

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duce bad results—that tinkering with nature isn't wise.

After the society's annual conference in San Diego, California, this past summer, I went out with Lester G. Milroy III, the society's president, to an undeveloped area on the edge of San Diego where coastal horned lizards still live in their natural habitat. Passing a chamiso bush, we heard a rustling sound. Lester peered into the shadowy underbrush, then plunged his hand in and pulled out a large female horned lizard, nearly five inches long. The lizard had red horns and a reddish back, and yellow scales on her belly. Lester estimated this might be her eighth summer, about as old as horned lizards grow in the wild, but when he put her in my hand, she clung to my fingers with her tiny toes like a child clutching its mother.

"The thing you have to understand is that each of these little guys is an individual," said Lester, plucking at the sterling-silver image of a horned lizard on his shirt pocket. "It has its own way of reacting, its own way of hunting, its own way of communicating. That makes it all the worse when one of them dies."

Lester gestured toward a line of new houses in the distance. "I know that people need places to live and malls to shop in," he said. "But thousands of acres of habitat for all kinds of animals are disappearing across the West each year. We in the Horned Lizard Conservation Society hope that horned lizards will make people reconsider their rights and responsibilities regarding horned lizards and other animals, including people."

In the meantime, I'm enjoying the squeals and stories with which everyone I meet responds to horned lizards. Just this morning an acquaintance told me, "One time one of the kids caught a horny toad, and that made it unhappy." When the child put the lizard down, "it puffed up, hissed and acted like a windup attack toy—then clamped onto the kid's shoe and just wouldn't let go."

And the other day a friend who has a lot on her mind called and said, "This morning on my walk I saw a beetle that had its back piled with mud. But then I bent down to study it." Here she paused and giggled, all life's worries temporarily gone.

"It was a horny toad."

The short-horned lizard lives in higher and cooler places than any of its kin, in a range that extends from Canada to Mexico. Its colder habitat dictates that it is the only U.S. species to give live birth.

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Seven-foot, 19th-century crocodile mask of turtle shell, wood, bone and fiber is from Mabuiag in the Torres Strait Islands, between New Guinea and Australia. Masks were used there for harvest, initiation, funeral rites.

Round and round the world, life is a masquerade

Who is that masked man? All of us, says a new book that examines the human propensity for changing our identities

They are worn by highwaymen and bank robbers bent on dark deeds, by revelers whose inhibitions evaporate behind their disguises, by children who transform themselves into fantastical monsters at Halloween, by mortal men and women who metamorphose into gods during religious ceremonies. Indeed, masks appear in virtually every culture on Earth.

They come alive in a new book, *Masks and the Art of Expression,* published by Harry N. Abrams. It is the work of John Mack, Keeper of the Department of Ethnography at the British Museum, and a team of social anthropologists, art historians, Egyptologists and classicists. The book's 150 color photographs represent masks used for every conceivable purpose in cultures from Oceania and the Pacific Northwest to classical Greece and Rome.

Among the Chokwe in Africa, a masked figure serves as escort during the painful circumcision rites and the yearlong period of seclusion that follows. Some African masks are discarded after use—they are freighted with so much meaning that they are too dangerous to keep.

Mask from Vanuatu (right), of palm spathe with tresses of vegetable fiber, was worn by dancers at pig feasts.

By contrast, the gold funerary masks of ancient Egypt, signifying divine power, were meant to last for centuries. Masks bestowing similar authority have been found in Aztec, Inca, Maya and Olmec burial sites.

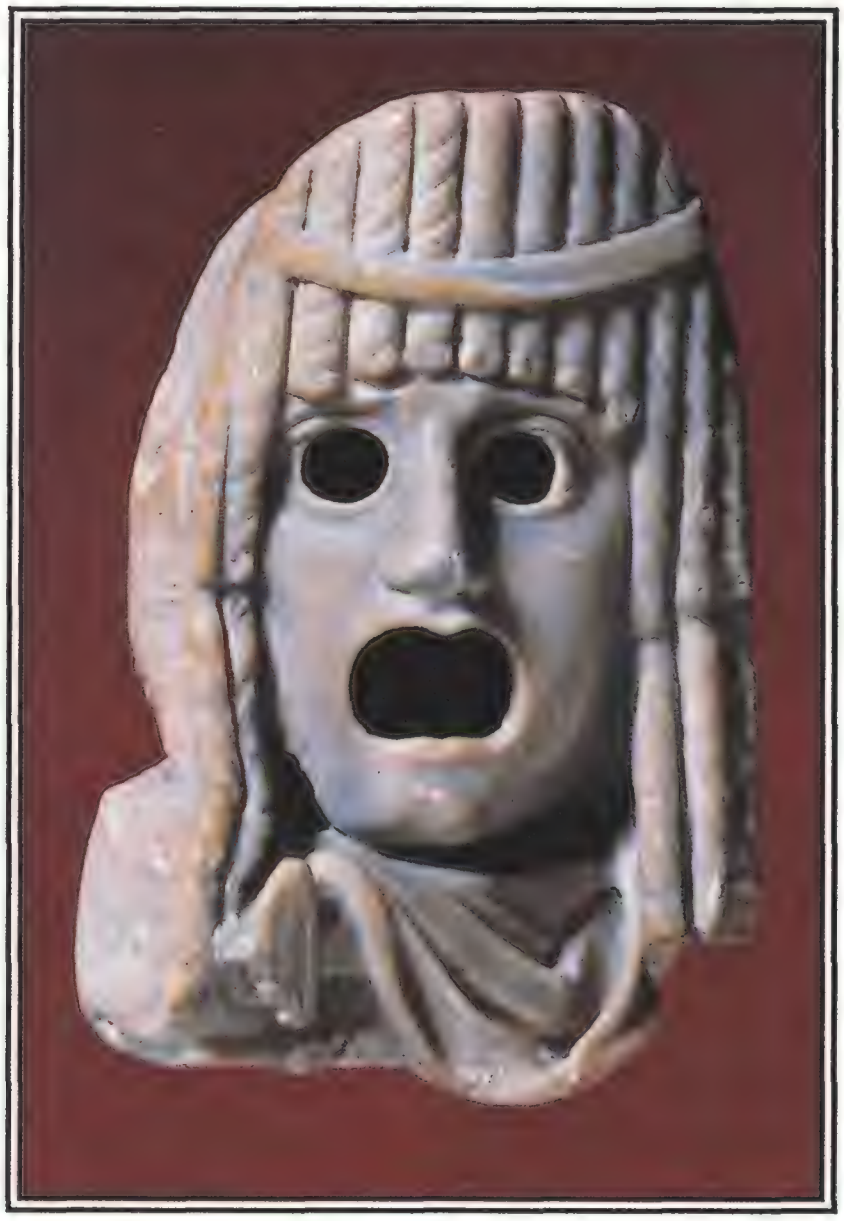
Contemporary masks in Mexico and Central and South America are used to celebrate the changing agricultural seasons with characters representing ancient deities. At Tlingit potlatches, or feasts, in the Pacific Northwest, elaborately carved or shamanlike wooden masks are donned for ritual dances.

Masks also have ancient ties to the performing arts. In the classical Greek theater the expression on a mask defined the basic persona of the actor, while in Japanese No theater the masks are generally expressionless, leaving it up to the actor to imbue the character with emotion through body movement.

What underlies our need to participate in this eternal masquerade? The mask, says John Mack, "is used at those times when the human experience is transforming—birth, death, initiation, seasons of the year—the basic cycle of life."

Marlane A. Liddell

Among the Ibo in Nigeria, a white-faced mask is viewed as beautiful and serene, a black or red mask as fierce.



Roman marble relief mimics Hellenistic-style theater masks; exaggerated features drew attention to actor.

Leather "tiger" masks are donned for ritual battles enacted at Festival of the Cross in Guerrero, Mexico.

Contemporary mask of Okina is for oldest play in the No theater repertoire, performed only on rare occasions.

Mosaic-covered human skull, A.D. 1200-1519, is believed to depict Tezcatlipoca, the Aztec god linked to evil.

Simple stone burial mask, c. 100 B.C., from Guerrero, likely covered the face of a ruler or religious figure.

Although it resembles a "smile" button, child's mask represents Anpanman, a popular cartoon figure in Japan.

Killer whale and ravens perch atop Haida helmet mask from British Columbia, used during dances at ritual feasts.

Antique No theater mask was worn by actor playing Hannya, the jealous, revengeful demon, once a beautiful woman.

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THE STRENGTH OF EXPERIENCE

By John Dornberg

Count Rumford: the most successful Yank abroad, ever

A poor American lad, Benjamin Thompson, won riches, a title and much fame in Europe as a sheer genius and benign administrator

Rumford memorabilia include a sketch of youthful Thompson, a Rumford medal of science, accounts of his inventions, a baking powder named for him.

Maximilian Strasse is one of Munich's grandest avenues, lined by deluxe hotels, elegant stores, theaters, art galleries, museums and government buildings. About midway, set on a ten-foot granite pedestal, is the twice-life-size bronze statue of a strikingly handsome man. He is in the regalia of an 18th-century general, his right hand resting lightly on the tasseled knob of a field marshal's staff. In his left hand he holds a partially scrolled map. His right leg is set slightly forward, his piercing eyes seem to gaze off into the distance.

The bronze inscription on the pedestal's street side identifies him as the Count of Rumford. On the back it reads: "Erected 1867 by Maximilian II, King of Bavaria."

"Obviously some local hero," a passer-by is inclined to say. But as it happens, an imposing duplicate of the statue also stands in front of the public library in Woburn, Massachusetts (pop. 36,000). Placed there in 1900, it honors a local boy named Benjamin Thompson.

Rumford and Thompson were one and the same. Taken together they made up a man of so many parts that it is hard to count them, though they clearly make him the most successful American abroad, ever. A paradoxical figure, Rumford-Thompson was a world-class social climber and social reformer, brilliant, innovative, egocentric and vain. He hobnobbed with dukes, electors, kings and emperors, but was loved by paupers and beggars, whose lot he improved considerably. Statesman, diplomat and administrator as well as autocrat, he managed to be both philanthropist and miser, humanitarian and misanthrope. And, of course, a ladies' man who attracted illustrious and beautiful women, even as he grew notorious for treating some of them like doormats.

Besides the Maximilian Strasse statue, Munich has another Rumford monument. Also a major downtown street named after him. Harvard University still has a Rumford professorship of physics. There are two prestigious Rumford medals of science, both endowed by and named after him, one awarded by Britain's Royal Society for outstanding research on heat or light, the other by the American Academy of Arts and Sciences.

His essays and scientific papers run to 2,500 pages and range from a molecular motion theory of heat to the nutritional value of potatoes; from the humane treatment of convicts to the building of better fireplaces; from military logistics to the invention of a coffeemaker and a final solution to human poverty. In the 18th century he was recognized as a great physicist and inventor; also as a thinker, organizer and administrator. He was a general in the armies of two countries. He successfully reorganized and ran a small European state.

He was also a man who callously deceived both family and friends, a traitor to his native land, a spy for the British during the American Revolution. Yet in 1798 President John Adams called him a "genius" and promised "a reception as kind and civil as it may be in my

As a colonel in the British Army in 1783, youthful Thompson sat for a portrait by Thomas Gainsborough. Soon afterward he set off for the Continent and a new career as the resident brain trust in Bavaria.

Munich statue describes him as "Benjamin Thompson, Count of Rumford, born in Woburn, Massachusetts."

power to give" were Thompson to return to America. Franklin D. Roosevelt once classed him with Thomas Jefferson and Benjamin Franklin as the "three greatest intellects America ever brought forth."

Like many lovers of the high life, Thompson was born poor. His father, a hardscrabble New England farmer, died in 1754 when the boy was 19 months old. His mother swiftly remarried; the boy grew up feeling betrayed and insecure. In an early diary he recorded a resolution to "never pass up an opportunity of advancement."

He was, of course, some kind of genius. "By the time I was 14," he liked to boast, "I could predict a solar eclipse to within four seconds' accuracy." His formal schooling in Woburn was scanty and sporadic, but he was soon bombarding neighbor Loammi Baldwin with questions about the nature of wind and light, eventually proposing that, like Benjamin Franklin, they launch a society "for Propogateing Learning and usefull knowledge."

While he was an apprentice to a merchant in Salem, he got a local minister to teach him higher mathematics. In the summer of 1772, at only 19, he was invited by the Rev. Timothy Walker of Concord, New Hampshire, to start a school there. Tall, athletic, unusually handsome, with auburn hair and sparkling blue eyes, he took the well-to-do Walkers by storm, especially Mr. Walker's daughter Sarah, 33, just widowed after a two-year marriage to a man twice her age who had left her with a baby son and the biggest fortune in town. Sarah Walker Rolfe instantly fell for Thompson; he instantly fell for her money. Their daughter, Sally, was born in October 1774. Years later he liked to say, contemptuously, "She married me, not I her." After October 1775 he never saw Sarah again. By then he had moved on to a new opportunity for advancement—as an informer for the British.

John Wentworth, the royal governor of New Hampshire, met him, was greatly impressed and sensed that the young man might be useful to the British cause in the coming struggle between George III and his "damned Americans." By 1774 Thompson, who had almost no military training, was appointed a major in New Hampshire's royalist Fifteenth Regiment. The appointment fired resentment among New Hampshire veterans of the French and Indian Wars, and Thompson exacerbated it by making friends with Gen. Thomas Gage, the senior British commander in America, and his successor, Gen. William Howe.

Three times in 1774-75 Thompson was hauled before committees of correspondence as a Tory sympathizer and each time he got off. In fact, as secret papers (originally written in invisible ink) proved 160 years later, he was providing Gage and Howe with vital information on anti-British agitation in New England. By autumn 1775, in imminent danger of being tarred and feathered, at the very least, he fled to Boston. When George Washington's March 1776 offensive drove the British out, Thompson escaped by warship to London to begin a new career.

That spring the British capital was teeming with impoverished Loyalist exiles from New England. It was also a vibrant center of the Age of Reason—the city of Samuel Johnson, Edward Gibbon, Adam Smith, Jeremy Bentham and Edmund Burke. Neither the life of self-commiserating émigrés nor the humanist intellectual circles were to Thompson's taste. Aboard ship he had drafted an incisive overview of the political, economic and military situation in New England. This, with a letter of introduction from Howe, gave him access to Lord George Germain, Secretary for the Colonies, the man responsible for prosecuting the war. Thompson was 23 and headed for a career in government.

The bombastic Germain was to blame for many of Britain's blunders in America. But he was close to

John Dornberg is a journalist and writer based in Munich. His last article for SMITHSONIAN *(March 1994) was on a famous Polish salt mine.*

George III, and he saw in Benjamin Thompson a means to enhance his own tarnished political reputation. He appointed Thompson as Secretary for Georgia. In four years, with his instinct for self-ingratiation among the rich and powerful, Thompson had worked his way up to Under Secretary of State for the Colonies. As the official responsible for providing men and matériel for the British in America, a duty whose perks involved big bribes from suppliers, he grew very rich.

Germain, a skillful manipulator of men, vindictively punished enemies and warmly rewarded friends. He and Thompson got on splendidly. The younger man often stayed at Stoneland Lodge, Germain's estate, and escorted his wife and daughters to parties. That was how Thompson first met Sir Joseph Banks, the botanist who had sailed around the world on the *Endeavour* with Captain James Cook in 1768. It was Banks who in 1778, as president of the Royal Society, helped launch Thompson's next career, that of a scientist. In London, Thompson made his first serious mark by concentrating on his boyhood interest in explosives and gunpowder.

The 18th century had little standardization of firearms. Each gun and cannon was different. So were the positions and sizes of the touchholes (firing vents), the kind of shot and the powder cartridges used. There was no real understanding of the chemistry and physics of how powder exploded, and each gunner worked out his own formula. In military circles, gunner's myths—especially the one that cannon worked better and propelled balls farther in wet weather—were always topics of lively hearsay. One day in the spring of 1778, Germain, Thompson and military friends got talking about a popular notion that a little moisture in the powder increased firepower because it added the expansion of steam to the explosion of the brimstone, charcoal and saltpeter. Thompson decided to check it out.

In one nine-day period he ran 123 experiments in Germain's coach house. He repeatedly shot projectiles from one cannon with variously sized charges. He measured the result by aiming at a heavy pendulum, then carefully calculating and comparing its swing and the gun's recoil. His conclusion: wet powder was no help; dry powder was better. His 99-page paper "New Experiments upon Gun-powder," published in the *Philosophical Transactions of the Royal Society*, established him as a serious researcher. The Royal Society was made up mostly

Thompson's birthplace in Woburn, a small city north of Boston, has been a museum for more than a century. Some 500 visitors a year use its library, study models of his many inventions, enjoy portraits of his mistresses.

The most successful Yank abroad, ever

Models in Woburn museum include early fireplace (left) and Rumford's new version, the first to use a damper.

Comic cartoon, "The Comforts of a Rumford Stove," shows a man warming himself at new Rumford fireplace.

of amateurs committed to "Improvement of Natural Knowledge," but election as a fellow of the society let him add an imposing "FRS" after his signature.

In the waning days of the Revolution, Germain's political fortunes plummeted, so Thompson wrangled a commission as lieutenant colonel and went to New York to command the King's American Dragoons, a ragtag outfit of Tories and mercenaries that terrorized Long Island in 1782 and early '83. Just before the surrender of Yorktown (SMITHSONIAN, October 1981), Thompson attempted to take his dragoons to the West Indies and then returned to London, where George III promoted him to full colonel and pensioned him off at half pay for life.

He was only 30, still restless and looking for adventure. "If there should be a war [on the Continent]," he wrote a friend, "I shall engage in it, on one side or the other, I don't care a farthing which." When he heard that the Austrians and Ottoman Turks might soon be at each other's throats again, he headed for Vienna to offer his services to the Habsburg emperor Joseph II. Aboard ship he met historian Edward Gibbon, who would offer a sarcastic note about his fellow passenger. He was traveling, Gibbon wrote, with "Mr. Secretary, Colonel, Admiral, Philosopher Thompson."

En route to Vienna, Thompson passed through Strasbourg, where he met the 27-year-old duke Max Joseph of the Zweibrücken-Palatine branch of Bavaria's Wittelsbach dynasty. The duke was immensely impressed. He advised Thompson to stop in Munich and visit his uncle Karl Theodor, Elector of Bavaria, who might offer a more interesting job than Emperor Joseph II would. Thomp-

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Model of a Rumford device for measuring heat radiation from various substances is displayed at the museum.

Rumford showed heat is not a substance by drilling a metal cone in a bulb of water, heating cone and water.

son did so, and Karl Theodor immediately suggested that he stay to implement much-needed civic reforms.

Another career loomed. Thompson needed George III's permission to enter another monarch's service. It took six months to get it, and though it came with a knighthood, it also required that Sir Benjamin pledge he would turn British spy again. He was to report by code on pro-French Karl Theodor, who was considered a potential threat to Britain and the balance of power in Europe. Thompson agreed but soon welshed on the deal—and fell from official favor in far-off London.

Karl Theodor made him a colonel of cavalry and a court chamberlain, generously suggesting that he take some time to study German and look the country over (all expenses paid) before making a proposal about what he would like to do in Bavaria. Thompson acquired an entourage of servants and military aides and occupied the entire second floor of a sumptuous rococo mansion near the Residenz, the ducal winter palace.

Elsewhere in Europe affairs were rolling along in more than their usual unmerry way. In London, William Pitt was grappling with Britain's national debt. In Paris, the French Revolution was coming on. Miniwars broke out between Finland and Sweden, and Denmark and Sweden. Meanwhile, Sir Benjamin immersed himself in Munich court life, where he was much admired by the beautiful Countess Nogarola and her sister, Countess Baumgarten. He peacefully studied German and the customs of Bavaria, discovering that it was one of Europe's most backward countries, "with an aristocracy, military caste and civil administration steeped in a morass of decadence, indolence and corruption."

Karl Theodor also gave him a specially built laboratory where he did elaborate experiments on heat conduction in various media, among them water, mercury, air and a vacuum. He was promptly appointed to Bavaria's Academy of Science. The Roman Catholic Elector supported the study of natural philosophy in the hope that scientific analysis would enable Man to discover the handiwork of God. Always diplomatic, Thompson made a point of noting any element in his research that could be interpreted as revealing the Lord's glory.

He spent 16 years in Bavaria, the most productive of his life, and a period when he did his best work as an administrator, politician, social reformer and inventor. He developed various scientific instruments, including a photometer for measuring the intensity of light, and created a candle so consistent in the level of light it gave off that it became the international standard for measuring illumination in "candle power."

His social experiments kept firmly in mind the need for political stability and order. Yet the voluminous recommendations for reform that he eventually gave Karl Theodor were not only earthshaking but humane. He saw the army as the core of the rotting Bavarian apple. The soldiers robbed and tormented the peasantry. Bavaria's army officers, in turn, sadistically treated subordinates like virtual slaves. Karl Theodor agreed with him and promoted Thompson from colonel to major general and supreme commander, and appointed him minister of war and interior affairs, thus making him almost overnight Bavaria's most powerful official.

There was soon opposition to "this officious, impertinent Yankee," but it came to nothing. Swiftly Thompson

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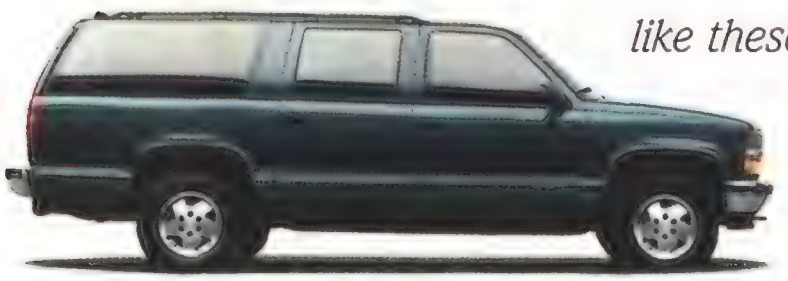

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Spectacular pagoda was conceived by Rumford as the centerpiece for the famous Englischer Garten he created in Munich in 1790. The people of the city are still devoted to its pink roofs and many gables. After World War II it was one of the city's first buildings to be restored.

made over the army, getting rid of 800 officers and promoting others from lower ranks in their place. He established permanent garrisons where soldiers could live with their families and farm when off duty. He set up schools for them. He put them to work building roads, draining marshes, cultivating wastelands and planting military gardens with potatoes, a food whose amazing nutritional value he was among the first in Europe to publicize. It was a grand precursor to 20th-century public works programs, but it cost Karl Theodor not one gold kreuzer. The new military enterprises paid for new barracks, uniforms, schools and salary increases.

The Englischer Garten, the world's first and still largest public park, was started in February 1789 as part of Thompson's military reform program. Located on a marshy spot beside the Isar River, it was to have vegetable plots and rest areas for the Munich garrison, a training area for cadets, a veterinary college and an experimental livestock farm. When the French Revolution came, with the July 14th storming of the Bastille, it left Karl Theodor in shock but only strengthened Thompson's conservative convictions. The evolving spectacle of the Terror, the national dislocation—and a total loss of the very Rights of Man it had just declared—did not convince him that the replacement of the king with "the people" as the source of absolute power was a sensible idea. The people's capacity to judge whether they are wisely governed seemed to him a "fictitious fancy born out of false notions of enlightenment."

The French Revolution made urgent the need to turn the new park over to the general public. A people free to stroll, enjoy nature and amuse themselves in a vast park, for example, Thompson told Karl Theodor, would be less inclined to storm their sovereign's palace. The Elector decreed that the park was to be "fashioned for the general pleasure" of Munich's public. By May 25, 1790, when a preview opening was planned, thousands of trees had been planted, roads and paths laid out, graceful bridges built. The marshes had been supplanted by lawns and clover fields. There was a little Apollo Temple. The veterinary school, today part of Munich University, was ready to open. Imported cattle grazed at the experimental farm. And there was a model pagoda, the Chinesischer Turm, inspired by one in Kew Gardens in London, with an adjacent café. Today it is still one of Munich's most popular beer gardens.

Though the Englischer Garten is Thompson's most visible legacy, it was one of his lesser achievements. Far greater were his social reforms, among them ridding Munich of legions of organized beggars. To do this he converted an old factory into a huge "military workhouse" with dormitories, kitchens, craft shops and classrooms. Then, in a single day in 1790, he had all 2,600 of the city's beggars arrested and registered. Simply for reporting to the workhouse, they were promised room and board, clean clothes and medical care. They were also taught useful trades, among them how to make army uniforms. Sale of their products would pay for their keep. Within a week the building was full and, miracle of miracles, everything worked out. Regarding beggars, Thompson wrote, pioneering modern liberal theory: "To make vicious and abandoned people happy, it

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has generally been supposed necessary, first, to make them virtuous. But why not reverse this order? Why not make them first happy, and then virtuous?"

His unorthodox ideas, in effect, laid the foundations for the modern welfare state. He established orphanages and public schools, and cleaned up prisons, encouraging the humane treatment and retraining of convicts. He promoted these projects as a means of keeping the "lower strata" happy and to insulate them against the "French infection."

He regarded the practices of the Chinese government—control of the masses by promoting traditional behavior and admiration for the most intelligent men—as nearest to perfection. "He relied wholly on the principle of order," naturalist Georges Cuvier noted. "He called order the necessary auxiliary of genius, the only possible instrument for securing any substantial good."

The masses revered Thompson. When he was seriously ill, prayers for him were said by crowds of Munich's poor in procession. When he returned to public life after a six-month convalescence, 30,000 people feted him in the Englischer Garten. Pleased, Karl Theodor loaded him with honors; as imperial regent of the Holy Roman Empire, he gave Thompson a peerage. As his title, Thompson chose "Count of Rumford"—for the Massachusetts town that became Concord, New Hampshire, where he had met, married and abandoned Sarah. The year he became a count, 1792, Sarah died.

His awareness of the nutritional value of the potato and the increasing need to feed larger and larger populations economically made him one of the first (self-taught) nutritional experts. He even concocted a special soup, a kind of *Volkssuppe*, made of potatoes, barley, peas, bread crusts, stale beer and water. Known as *Rumfordsuppe*, it is still a favorite on Bavarian menus today.

Not to mention the "Rumford Roaster"

That got him interested in scientific cooking. The conventional way to cook at the time was at an open hearth, with pots and caldrons hanging over the blazing fire, a method that was not only inefficient but tended, as Thompson said, "to cook the cook more than the food." His remedy: enclose numerous small fires in an insulated brick or stone box and set the cooking pots on top. It was what we now call a kitchen range. Thompson eventually supervised the installation of such stoves in poorhouses, orphanages and hospitals all over Europe, England, Ireland and Scotland.

Soon to follow were the first double boiler, the first pressure cooker and an innovative field kitchen. His most popular device was the "Rumford Roaster," in which meat was roasted slowly by hot air. The world's first convection oven, it was a large, round, iron pot with a door, built inside a brickwork oven. Two blowpipes with adjustable covers and a steam exhaust controlled the temperature and kept it constant. Hundreds were installed all over Europe and America. There are still some in New England today.

In 1795—the Terror had just ended in France—Thompson started writing to his daughter, Sally, and began thinking about a trip back to America. In September of that year he went on leave to London—ostensibly to deliver his essays and papers to a publisher but also to find some new social challenges. He soon did.

"The enormous waste of fuel in London," he wrote, "may be estimated by the vast dark cloud which continually hangs over this great metropolis and frequently overshadows the whole country." In a year or so, Napoleon I would come to power and soon would be conquering Europe. Karl Theodor might be in danger. Meanwhile, the now famous Count Rumford, 42, once more surrounded by admiring English women, still found time to design a more efficient fireplace. (His mistress Lady Palmerston complained that her bedroom was too smoky.)

Profiting from earlier work by Ben Franklin, he moved the back wall of his new fireplace forward, beveled the sides to throw more heat into the room, narrowed the

Rumford's royal patron, Karl Theodor, the Elector of Bavaria, supported his reforms of poor laws and the army.

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Marie Lavoisier, widow of the famous chemist (right), began a short and stormy marriage to Rumford in 1805.

throat over the fire, and created the first example of what is today called a "smoke shelf." The result: less fuel consumption, less pollution, more efficiency.

Sally, whom he had last seen as a year-old baby, reached London early in 1796. She was 21. So began a tortuous father-daughter relationship. Though Rumford had always been openhanded with whatever wealth he possessed, he was miserly with his daughter. He also proved a meddling and domineering father, so appalled by her small-town New England ways and lack of education (which he failed to provide) that he once described her opinions as "savage." Eventually he drove away all her suitors, among them Bavarian aristocrats and British gentlemen, so that she ended up unmarried. Their relationship might have become even more miserable had they stayed together longer in London. But in July came an urgent plea from Karl Theodor. France and Austria, at war on neutral Bavarian territory, were threatening a siege of Munich. Only a miracle—or Rumford—could save the city!

He reached Munich just as Karl Theodor was preparing to flee. The Elector gave Rumford full power over the city, appointed him commander in chief, then dashed out of the Residenz, leaving the count as ruler of Bavaria. A last brief but brilliant career—as head of state—had begun. Just before the French and Austrians dug in on opposite sides of the Isar, he mobilized 12,000 troops within Munich and sealed its gates. Each enemy threatened to lay siege to the city if Rumford helped the other. He negotiated for a week. Then the French force withdrew, followed a day later by the Austrian.

With order restored, he settled in Munich again, this time to make his most important scientific discovery. It concerned heat, which at the time was thought to be a substance, so declared by the famous French chemist Antoine Lavoisier. One day, while supervising the boring of new cannon at the armory, he touched some of the metal cylinders, and they were hot. Bore-hole shavings were even hotter—when dropped into a cup of water they heated it. That fact was hardly news. Blacksmiths had been aware of it for centuries. But Rumford wanted to know exactly why the heat resulted, and how it was passed along.

He set up controlled experiments, drilling into metal cylinders immersed in water and slowly bringing the water to a boil. It was convincing proof that heat could not be a substance. "It would be difficult to describe the astonishment of bystanders in seeing so large a quantity of cold water made to boil without any fire, and their surprise afforded me a degree of childish pleasure," he wrote in his paper on this experiment, sent to Britain's Royal Society in 1798.

Just then, Munich itself was boiling with various political intrigues against Karl Theodor, who helpfully appointed Rumford as Bavarian Minister to Great Britain. He and Sally arrived in London to learn that he was out of favor with George III, though the polite official reason given was that because he was still a British subject, he could not legally represent a foreign power in Britain.

At first he sulked. But he and Sir Joseph Banks had long discussed the need for popularization and practical application of scientific discoveries. Now they began planning the Royal Institution of Great Britain. In 1799, the year of Karl Theodor's death and Sally's return to America, Rumford turned to the project: "It will be productive of much good and place me in a distinguished situation in the eyes of the world and posterity."

Lining up financial sponsors, he bought the mansion on Albermarle Street where the Royal Institution still stands, and supervised the installation of exhibits, lecture halls, laboratories and library. He also recruited the first professors, notably the young chemist Humphrey Davy, who later discovered sodium and potassium. The Institution thrived, but Rumford was soon at odds with his staff, who objected to being treated like Bavarian subordinates. By late 1801 the rift was so wide that he returned to the Continent, in effect forever.

On his way to Munich he stopped off in Paris for a few weeks and stayed for several months. He was promptly acclaimed by Napoleon, Talleyrand and the entire

French scientific community, and was elected to the French Academy (only the second American, after Thomas Jefferson). More important, he met the beautiful widow of the distinguished chemist Antoine Lavoisier, who had been guillotined in 1794. Rumford was 48, still a fine figure of a man and famous; Marie was a few years younger, "very admirable in appearance," intelligent and well connected. She was also scientifically literate from having worked at her husband's side. They seemed made for each other. They bought a splendid house with her money and were married in 1805.

In his initial letter to Sally, Rumford described Marie as the "incarnation of goodness." Before their first wedding anniversary he referred to her as "that woman." By the third year she was "a female dragon." It became a publicly tempestuous marriage that titillated *le tout Paris.* (She once poured boiling water on his "beautiful flowers" and complained that he was clumsy at literary repartee.) After a divorce, in June 1809, the exhausted Rumford settled down in a rented villa in Auteuil and took a "housekeeper," Victoire Lefèvre, who bore him an illegitimate son, Charles.

Rumford kept experimenting, now mainly in the field of light. Then, on August 21, 1814, he died at age 61 "of a sudden and intense fever." He is buried in the Auteuil cemetery among other great men. But the inscriptions on his tomb are an ironic commentary on an American so loyal to Britain that he betrayed his native land. The vertical slab describes him as he wanted to be remembered: "A celebrated physicist, enlightened philanthropist, whose discoveries in the fields of light and heat made his name illustrious, and whose help to the poor will always be dear to friends of humanity." The horizontal stone refers only to his titles and positions in Bavaria, and his membership in the French Academy.

No mention of either America or England.

Revealing portrait of Thompson and his long-neglected daughter Sally was done after she joined him in London in the 1790s. He criticized her for being loud, clumsy and uncultivated—and for curtseying to the servants.

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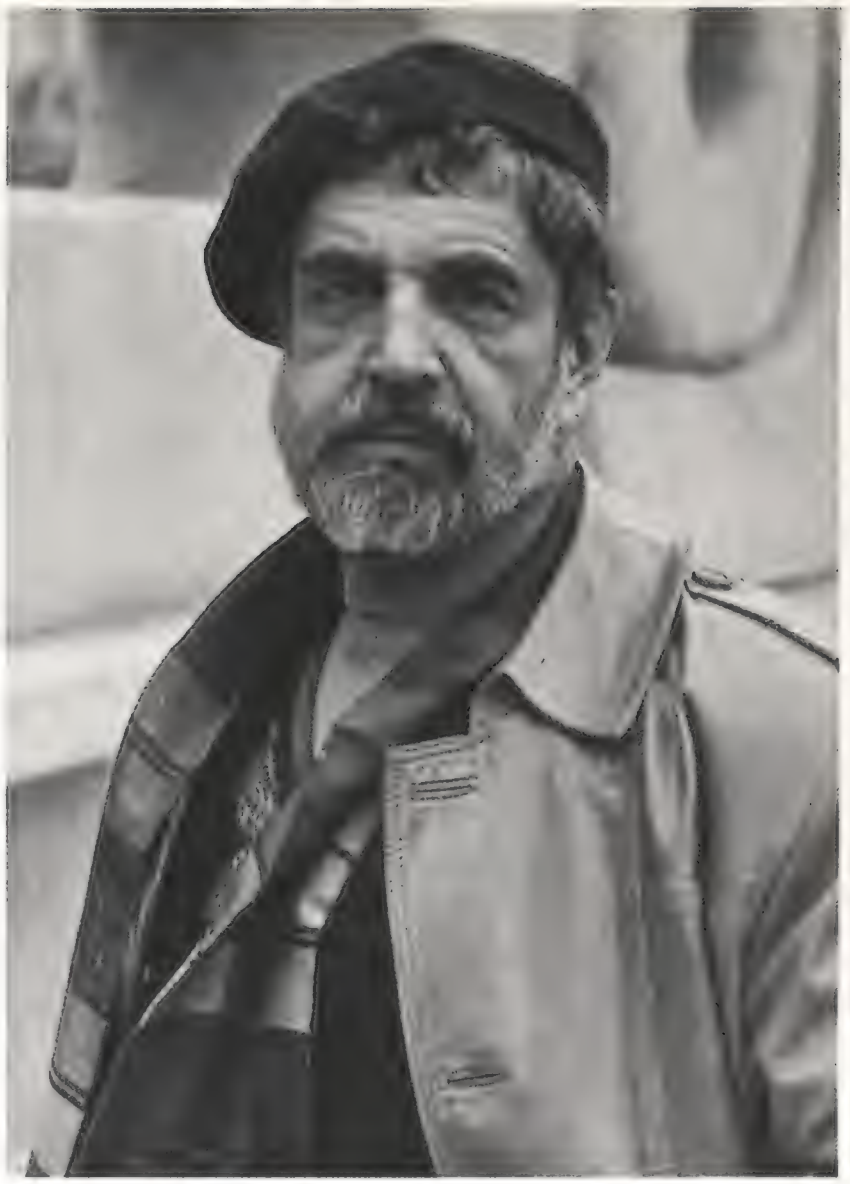
By Ruth Daniloff

An artist who faced down suffering with his eyes wide open

Russian sculptor Vadim Sidur endured pain all his life, but hardships only fueled his drive to tap the depths of the human spirit



At 56, Sidur was still relatively unknown. "The world in my cellar," he said, "has swallowed me up completely."

The first time I met the Russian sculptor Vadim Sidur, a terrible pounding on the door interrupted our conversation around the table in his subterranean studio on Moscow's Komsomolskii Prospekt. It was late evening in the summer of 1984. Vadim shot a glance at his wife, Julia. The secret police? My heart leapt in fear. I had parked my foreign car blocks away to avoid drawing attention to my visit, but clearly not far enough.

Vadim rose to his feet. He was a dark, thick-set man, his beard tinged with white. Under his beard was a disfiguring bulge where a bullet from a German sniper had smashed into his jaw during World War II. He left the room, followed by Julia, closing the door behind him. A Russian friend had described Sidur as an artistic genius and urged me to see his work, but now, as we sat in silence, listening to the rise and fall of men's voices, I wondered if it hadn't been a mistake. The last thing an artist or a journalist needed was trouble with the KGB. Finally, Julia and Vadim returned. "They wanted to see our documents," Vadim said. "They wanted to know why you were here. I told them we were only drinking tea." He laughed. He didn't seem upset. After all, it wasn't the first time the KGB had pounded on his door.

Vadim Sidur's whole life had been a struggle for creation under barbaric conditions. For years the Soviet state tried to break him. They tapped his phone, attacked him in the press, prohibited him from showing his work or traveling abroad, deprived him of his livelihood and paid him unannounced visits when he entertained foreign visitors.

Sidur's triumph over the evils of the Communist system to become a recognized artist was a heroic story that unfolded over many years. It included a small circle of courageous friends, a young scholar from Germany, a Russian photographer who, even now, continues to work on his behalf; a Soviet customs officer who looked the other way; Russian scientists who loved art; secret meetings with foreigners disguised as Russians; small-scale models smuggled abroad and recast as monumental works; and, last but not least, a wife determined to save her husband's work from oblivion.

Now, almost a decade after our first meeting, I pushed the heavy steel door open once again, about to enter Sidur's studio to visit his widow. So much had changed. Vadim was no longer alive and Communism had crumbled. A heart attack felled him in 1986, a few weeks after Chernobyl—a catastrophe his works had foreshadowed. Then he was persona non grata; now he is a hero, hailed as a great sculptor by the Russian critics. "Vadim Sidur," asserts Alexander Morozov, a Moscow University cultur-

The Wounded was inspired by a patient at the hospital where Sidur was sent after being shot in World War II.

Photographs by Eduard Gladkov

Sidur worked in a variety of materials, among them found objects, or "junk." Works here include, from the left, *Memorial for the Victims of Violence* (1965); *Family* (1979); and the whimsical *Maiden in the Bath* (1981).

al historian, "is one of the classics of modernism in the 20th century." Today his work is exhibited in the former Soviet Union, Eastern Europe, Scandinavia and Germany. Books about him have been published in several foreign languages. Even more astounding, the Russian government has opened a museum in his honor.

Julia had been 17 when she met Sidur; he, 33. She had been all things to him: model, lover, wife, mother, critic, muse and now executor. Her oval face and almond eyes appeared in hundreds of his works. As she conducted me around the studio, she noted with a sad smile that her husband had joined the ranks of Russian artists who had been oppressed in life but revered in death. Cynics argue that Russian artists and writers need oppression in order to create. Certainly, many post-*glasnost* writers and artists are floundering now that hidden anti-Soviet messages no longer count as art. Sidur, however, was never a dissident. His themes were universal, not political.

Vadim's studio was neater than when I saw it in 1984. The sculptures, which hadn't yet been moved to the museum, stood around the walls. To the left of the doorway loomed *Modern Crucifixion*, a huge Christ made of scrap metal. On the floor in a wooden box lay *Coffin Woman*, a figure in Sidur's "Grob Art" ("Coffin Art") series. Despite her heavy sewer-pipe limbs and torso of coiled springs, her hands reached out toward the edge of the casket as if to fly away. Vadim's overalls and cap hung from a hook on the wall next to his self-portrait: a lopsided spade covering a mangled metal face, topped by a black beret. His chisels lay in order on a shelf. Today his studio is a shrine; visits, arranged in advance, are conducted by a widow with a mission to spread her husband's legacy.

Julia led the way to the back room where she had laid out tea, chocolates and cookies. In the 1960s, following Khrushchev's exposure of Stalin's crimes at the Twenty-Second Party Congress, this room became a secret gathering place for intellectuals: writers, poets and scientists who were Vadim's friends. A water-stained blowup of a picture of Sidur, taken by Eduard Gladkov, the Russian photographer who documented the sculptor's life and works, looked down from one corner. The shelves around the room were lined with Sidur's works in ceramics, clay, wood, plaster and marble. In all, he left more than 600 sculptures and thousands of graphics.

While we talked, Sidur's powerful sculpture *The Wounded* seemed to stare at us with unseen eyes, the figure's head swathed in bandages, his mouth a black hole of agony. One arm is severed at the shoulder, the other has no hand. "I saw him at the hospital while I lay there because of my shot wounds. He had half his face shot away. They fed him with a length of hose," Vadim had said of the disturbing figure who appears in many of his

Cambridge-based author Ruth Daniloff has lived in Russia for a total of nine years. She wrote on the Russian Decembrists' wives in June 1991.

Sidur's sense of humor comes through in *Portrait of My Wife*, with keys used for bangs, nose and earrings. At far right is a small model of *The Admonisher*; the large sculpture stands in a public park in Düsseldorf.

works. "I don't know what happened to him, I suppose he must have died." By all rights Sidur should have died too. The German bullet, which plowed into his upper left jaw below the eye, should have exploded and killed him. His escape from death, and his tortuous rehabilitation, marked him for life. Though his work ranged from socialist realism to found-object sculptures, violence and suffering remained a constant theme.

Born in June 1924, Vadim Sidur, like most Russians of his generation, entered a world overshadowed by war, famine, secret police and forced labor camps. He first encountered sculpture as a young boy in Ukraine. At one time, someone had dragged two huge stone idols from an ancient Scythian burial ground on the steppe and placed them outside the Historical Museum in his native town of Dnepropetrovsk. These *babi*—"old women," as they are called by the locals—made a lasting impression on Sidur. "Their majesty, their calm grandeur, seemed destined for eternity," he said. The influence of such monumental figures continued throughout his work. "I've always tried to adhere to one principle," he said. "To avoid outer dynamics—those of gesture—and to concentrate on inner tension."

Before being drafted into the army at age 18, Sidur worked as a factory lathe operator. Two years after being dispatched to the front as a machine gunner, he was wounded. Sidur's shattered face was slow to mend. In 1945, still swathed in bandages, he left for Moscow for further treatment at the Central Institute for Physical Injuries. The mutilated and twisted bodies of his fellow patients horrified him. "They wandered around the corridors, sometimes even outside, with faces made of plastic or cardboard instead of their own. Even more terrible to imagine was what was concealed behind the cardboard," he said. Confronted by such suffering, he abandoned his childhood dream of becoming a doctor. "I realized I was never going to reconcile myself with the painful, humiliating death in the hospital, never grow accustomed to the suffering of the sick. Those who survive can never replace those who have died in agony."

In 1946, when Pollock, Gorky and de Kooning were inventing abstract art in the United States, Sidur enrolled in the Department of Monumental Sculpture at the Stroganov Institute of Art in Moscow. At that time, the school was preparing painters and sculptors for work on the enormous buildings so popular with Stalin. In Russia an artist's job was to serve the state. Socialist realism was the order; abstractionism, a capitalist abomination. Sidur's training was classical. By the time he graduated in 1953 he was familiar with Babylonian, Egyptian, Greek and Mexican art, as well as Russian iconography and folk art.

Sidur's early works conformed to socialist realism. In 1956 his clay figures, exhibited at the prestigious Academy of Arts, won plaudits from the critics. A year later the Artists Union welcomed him into their ranks. It wasn't

In 1980 Sidur looked over *Structure No. 2* shortly after he had completed the sculpture at the Institute of Geochemistry in Moscow. Scientists there called the work a "wall" so Soviet authorities would allow it.

long before he tired of works glorifying the state and turned to more expressive forms. Not unexpectedly, the state punished him by prohibiting him from exhibiting. Refusing to compromise, he worked in relative obscurity until he died in 1986.

"The state wanted statues of steel workers, tractor drivers and milkmaids. Ours was supposed to be a country of socialist optimism. There was no sex and no nudes," Julia said, taking one of Sidur's works off the shelf. It was a small terra-cotta piece of a boy and a girl on the beach. The boy's leg was draped over the girl's calf. "The critics complained that it was pornographic and that his themes were trivial for a country building Communism," Julia laughed. "They complained that the legs of his women were too fat."

For a man who was persecuted all his life by the Soviet government, Vadim Sidur was surprisingly apolitical. What interested him was the universal human condition, not ideological statements or commentary. While he challenged the artistic dictates laid down by the state, he never questioned the Communist system itself until Khrushchev revealed Stalin's crimes after the dictator's death in 1953. He often referred to himself as a "Soviet man." As a youth he joined the Komsomol, then later the Communist Party. As a member of the Artists Union he took for granted the studio, the subsidized materials and the guaranteed income as a book illustrator.

By the late 1950s Sidur was beginning to experiment with form, creating nonrepresentational figures. The large, simple, rounded sculptures were reminiscent of Henry Moore's, though at that time he had never heard of Moore, let alone seen his work. Sidur matured in a vacuum, uninfluenced by Western modernism. Only after the thaw, beginning in the early '60s, did friends introduce him to the Russian avant-garde and the works of Western artists such as Lipschitz, Giacometti, Zadkine or Picasso. His artistic development, he insisted, stemmed from archaic art.

During the '60s Sidur's work displayed increasing pessimism and despair. Human beings, he believed, had been granted the powers of the gods and were on the brink of self-destruction. His 1968 *Nike*, commemorating the "victors" of World War III, is a blackened, totem-like figure holding a grotesque disfigured human head in triumph above her.

At about this time, Sidur began working with junk. A socialist state, where no one feels responsibility for guarding government property, was paradise for the junk artist. Sidur roamed abandoned sites and the courtyards of apartment buildings, collecting anything he could incorporate into his sculptures: old plumbing fixtures, automobile parts, handles of tools, wire mesh, keys, cans and lost toys.

Though Sidur's major artistic theme was suffering, inhumanity and death, his work also displayed an acceptance, even love, of life, especially after a heart attack in

1961 at the age of 37. Even his most monstrous found-object sculptures possess something touchingly human. "After his heart attacks, he knew he could die any moment, so life became very precious to him," said Julia.

Later, after a second heart attack in 1984, he turned to graphics, producing hundreds of drawings, including a series entitled "Mutants." Flowers and sexual organs spring, like branches of a tree, from the limbs and torsos of these distorted figures. Yet, with all the warped bodies, many of the faces are confused and gentle.

The sexual allusions in Sidur's drawings and his later work in scrap metal triggered a barrage of attacks in the Soviet press, which accused him of being a tool of Western pornographers. But for him, these works were an affirmation of life.

Sidur's confrontation with the Soviet state came to a head in 1974, during one of the KGB's crackdowns on dissidents. Thanks to phone taps and informers, the secret police had learned that Sidur was smuggling his works abroad. Authorities were particularly incensed by a drawing of Solzhenitsyn that fell into the hands of Western journalists. The Artists Union summoned him to a meeting, but he pleaded illness and refused to go. Later he was expelled from the Communist Party. "Every day we waited for the knock on the door and for Vadim to be arrested," Julia recalled. "It was a terrifying period. And when he wasn't arrested, we were frightened that the Artists Union would take the studio away."

Too many foreign friends for a vendetta

So why didn't the Soviet authorities arrest Sidur and send him to the Gulag? The thing that saved Vadim, Julia believes, was that he was a war veteran with medals. "The authorities hated his work, but they approved his antiwar stand," says Eduard Gladkov, who lost his photography job at this time for his association with Sidur. "They were reluctant to move against him, especially when he had so many foreign friends who would protest." War veteran or not, the state didn't hesitate to force Sidur into poverty by cutting off his work as an illustrator. From then on, the family struggled on Julia's meager salary as a French teacher in a high school.

Continuous anxiety over the future did little to improve Sidur's heart condition. By the early 1980s he was so weak that he could no longer work with heavy materials. He began to use fabric, creating rag-doll sculptures with the help of a seamstress. He also made drawings and wrote poetry. He worked frenetically, each day being a reprieve from death. In April 1986 he suffered his third heart attack. During the next several weeks of illness, until he died in a Moscow hospital on June 26, he forced himself to work. The day before his death, he completed 14 drawings. He was 62.

Like most Russians, Sidur believed in destiny; it was his destiny to be a great artist. His three escapes from death—the German bullet and two near-fatal heart attacks—proved it. "I stayed alive," he said. "I sometimes think this was so I could leave my monuments to the victims of violence behind me."

According to him, "strange altruistic figures" crossed his path to give him aid. In 1969 a young German scholar named Karl Eimermacher, who so resembles Vadim that he could be his brother, entered his life and changed it. By chance, Eimermacher, who was in Prague, saw some Sidur reproductions in a magazine.

"I was so impressed, first that such nonconformist work was being done in Russia, but also by the quality of the work; and I was determined to meet the artist," said

Sidur's portrait of the suffering Christ, from 1978, transforms mundane objects into a moving work of art.

Memorial to Soviet soldiers who died in Afghanistan stands near Sidur Museum on outskirts of Moscow.

Eimermacher, who is now director of the Lotman Institute of Russian and Soviet Culture at Ruhr-University Bochum in Germany. Eimermacher rushed to Moscow to meet Sidur, beginning a friendship that lasted for almost two decades.

Sidur was already known in Eastern Europe, where several articles had been written about him. Now Karl Eimermacher introduced him to the West. Over the next years, most of Sidur's small-scale models were smuggled out of the country in tourists' suitcases or diplomatic pouches and recast as monumental sculptures. Thanks to Eimermacher's dedication to a friend, ten of them now stand in public places in Germany. They include *Death by Bombing* in Würzburg; *The Victims of Violence* in Kassel; *The Ones who Died of Love* in Offenburg; and *Treblinka,* outside one of the law courts in Berlin. Eimermacher also organized more than 20 exhibitions of Sidur's works in Germany. Old habits die hard; even now, after the KGB has been defanged, Karl Eimermacher refuses to reveal the names of the heroic people who smuggled Sidur's works out of Russia. "We can't talk about it, any more than we can talk about who smuggled Solzhenitsyn abroad," he said on a recent visit to Moscow. "Many people helped. Sometimes in the middle of the night I would receive a telephone call from a stranger. He didn't identify himself; he just said 'I bring you greetings from Moscow and I have a parcel for you. Where can I send it?'"

Support for Sidur came from another unexpected source: scientists. The Soviet government viewed scientists as invaluable members of society. If their taste in art went beyond busts of Lenin, the ideological watchdogs sometimes looked the other way. When the Institute of Morphology and Man and the Institute of Geochemistry decided to erect a pair of works by Sidur at the entrance to their buildings, they devised a brilliant ruse to pull the wool over the eyes of the bureaucrats. "We presented the sculpture to the Ministry of Culture as a decorative wall," says Leonid Schtutman, the architect who contracted with the two institutes to buy and set up the two huge monuments (p. 122). "There was no way they could object, especially when the sculptures were so cheap."

A customs officer also looked the other way

Perhaps the strangest of the altruistic figures in the Sidur story was a Soviet customs officer. He was an omen, Julia believes. "It was the first time we'd smuggled one of Vadim's sculptures abroad," she explained. "A tourist agreed to take it. The officer opened the suitcase, found the sculpture, examined it, then let it pass." Suggest to Julia that maybe the customs man didn't recognize the small-scale model for what it was, and she smiles enigmatically and says, "He knew, but for some reason he believed it should be in the West."

Although the Soviet state was on the verge of collapse when Sidur died, Julia and their son Mikhail were terrified that his work would be confiscated or destroyed. Their fight to preserve his legacy coincided with the power struggle between Gorbachev and his conservative enemies. Desperately, widow and son petitioned influential friends for help. Artists, scientists, journalists and many others joined them in their campaign. Their efforts paid off. On April 29, 1987, an indignant article appeared in a widely read journal. Why, asked a prominent Russian scientist, could Westerners see Sidur's works when Russians couldn't? "That seemed to do the trick," said Julia. "A month later the Soviet Peace Committee sponsored an exhibit of Vadim's works."

News of the Sidur exhibition spread by word of mouth, and people flocked to the opening, standing in line for the doors to open. After the show closed two weeks later, letters poured into the Soviet Peace Committee, the Ministry of Culture and the Moscow city authorities, demanding a permanent exhibit. The political winds were shifting. Vadim Sidur's name began to appear in the Soviet press alongside those of other victims of the Communist system, such as writers Anna Akhmatova, Boris Pasternak and Osip Mandelstam. Concurrent with Sidur's exhibition in Moscow, the Hermitage

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Sidur combined a beret with an old shovel and other castoffs for *Self-Portrait* (*Father of Coffin Art*).

Museum in Leningrad (now St. Petersburg) put on a show entitled, "Sixty Years of Unofficial Russian Art."

It was then that Julia and Mikhail got the idea for a museum. A fight developed between Moscow local party officials, who wanted to help finance it, and the Soviet Ministry of Culture, which still had Sidur on its black list. Finally, in the spring of 1988 after Gorbachev eliminated his conservative enemies, the Soviet authorities granted permission for a museum. It opened 18 months later in a five-story, yellow-brick building in the Perovo District, a working-class suburb of Moscow.

On a snowy afternoon I accompanied Julia to the Sidur Museum; from the subway station you can see the building with "SIDUR" in large letters across the top. In the distance, factory stacks belched steam and smoke into the glacial air. On the way we stopped at the small park to the right of the street to see Sidur's monument to the 15,000 victims of Afghanistan. The three faceless bronze figures with hollowed-out chests rose dramatically against the glow of the setting sun. If there is any vindication for Vadim Sidur, it lies with these three huge, grieving figures; and with the statue honoring Jewish victims of the German Occupation during World War II, which was recently erected outside of St. Petersburg. Sadly, Vadim wasn't among the thousands of people who gathered to watch Alexander Rutskoi, the Russian vice president, unveil the Afghan monument before foreign and Russian journalists.

At the museum, several people were unloading a truck of Sidur's sculptures that were being returned from an exhibit in Bremen, Germany. Mikhail Sidur, who gave up his job as a French translator to become director, was checking off the works from a list. I followed Julia up the stairs to a large hall on the first floor, where Sidur's works stood on pedestals around the room. Like most museum exhibits in Russia, the lighting didn't do justice to the artifacts. The second floor is for rotating exhibits; on this visit it featured artworks that dealt with the theme of mother and child.

Julia is delighted by her husband's recognition outside Russia, but more important to her is his acceptance as a major artist at home. Unlike Ernst Neizvestny, the Russian sculptor and Sidur contemporary who now lives and works in New York, Sidur never wanted to emigrate. To the end of his life he never left his homeland. "At one point, when we were frightened about what would happen to all his work, there was talk of smuggling everything to Germany, but he never wanted that. He wanted his works to stay here," Julia said.

"We want this to be more than a museum," Mikhail said, joining us for tea and candied fruit. "We want it to be a meeting place for writers and artists, to re-create the atmosphere which used to be in my father's studio."

The political struggle may be over. But now, like the rest of Russia, the museum must fight to survive. Fear of the KGB has been replaced by financial anxiety. Glasnost has brought freedom to artists but headaches to museum directors, who can no longer depend on state subsidies to run their institutions. Today Julia and Mikhail are battling to catalogue Sidur's works, arrange exhibits and undertake restorations. Still, Mikhail Sidur is optimistic. "People are becoming millionaires in our country," he said. "They have their dachas and foreign cars, now they are starting to think about art."

Sometimes it is hard for Julia and Mikhail to believe the turnaround in Sidur's fate since his death. "The Russian state has always considered artists to be their enemies," Mikhail said. "Only after they're dead are they no longer frightened by them, but with Sidur it has happened so fast."

Still, Julia can't relax. In Russia anything can happen. "Who knows?" she said when I rose to leave the museum. "If some reactionary forces come to power, they could decide they want the building for something else and throw all Vadim's works in the trash."

In a rare moment of relaxation, Sidur, surrounded by some of his smaller works, played with his cat in 1981.

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By Nancy Shute

Life for lefties: from annoying to downright risky

Recent research suggests that the deck is stacked against us southpaws—but we can deal with it, thank you very much

Gen. H. Norman Schwarzkopf, relaxing in his Florida office, was telling me one of his war stories. Deep in the Arabian desert, during the 1991 Persian Gulf conflict, he was faced with a situation he knew would test his skills to the utmost: eating dinner.

Saudi Arabian tribesmen had invited the commander of the U.S. forces to a banquet. "You're out in the desert. They bring forth these huge communal plates of food," he said. "You reach into the plate and wad the food into a ball.

"You only eat with your right hand," the general continued. "The left hand is polluted. It's a Muslim custom." But Schwarzkopf knew something that, for him, transformed the meal from a festivity into a trial: he's left-handed. Each time he began to relax, his left hand would reach for the food. How was he to avoid a diplomatic faux pas? "It was so awkward that I literally sat on my left hand," the general said, laughing. "I just stuck my left hand under my rear."

With his dominant hand imprisoned, the general could give no offense. But he still had the problem of a right hand untutored in the fine motor skills that this meal called for. "I would never quite get my ball wadded up enough and would dribble rice down my front as I tried to get it down my mouth," Schwarzkopf admitted. His hosts graciously ignored his dining habits, and the alliance continued.

The general's dilemma is just one example of the challenges that beset the 10 to 15 percent of humankind—including Schwarzkopf and myself—who are left-handed. Persecuted for centuries as spawn of the devil and teased for being maladroit, we're just now hearing that the world really may be out to get us.

"Lefties Die Nine Years Earlier," world headlines gasped in 1991, when psychologists Stanley Coren and Diane Halpern published their findings. Left-handers have a shorter life span, the researchers concluded, not only because a world designed for right-handers makes lefties more accident-prone, but because the physiology of many left-handers makes them more susceptible to disease. Although lefties howled in outrage (who wants to hear that kind of news?), the controversy has led to new awareness of the odd lot of left-handers. More right-handers are getting a grip on left-handers' experiences (what's so tough, righties have frequently asked, about using scissors, corkscrews, power tools?), and scientists are beginning to understand that left-handers really are different, but not in the ways long imagined.

As if right-handed tools weren't enough for left-handers to deal with, there's a question of reputation. Throughout history, the left side of the body has been associated with darkness, ill-fortune and evil spirits, while the right has been linked to light, luck and virtue. The Bible, the Talmud and the Koran are rife with distinctions between saintly righties and sinister lefties. Buddha sends his adherents down the right-hand path to Nirvana; Satan sits to God's left and is often portrayed as left-handed. In separating the sheep from the goats, the Bible tells us, God consigned the unlucky goats to His left.

Language, too, reflects these rightward leanings. From the Latin *sinister* ("left") to our own "left-handed compliments," the left is synonymous with bad news. The English word "left" comes from the Anglo-Saxon *lyft*, which means weak or broken; the *Oxford English Dictionary* catalogues a spate of unflattering synonyms for "left-handed," from "defective" and "doubtful" to "illegitimate." Even the Gypsies, who one might think would understand—being a minority themselves—use the Romany word for left-handed, *bongo*, to refer to an evil person.

Social and ritual gestures follow suit; the right hand is used for shaking hands, saluting, making the sign of the cross, spinning prayer wheels and swearing on the Bible. The Muslim aversion to the left hand that confounded General Schwarzkopf is prevalent in the Middle East and Asia; it's based in practicality as well as tradition, as the left hand is commonly used for toilet hygiene.

Given the world's right-handed bias, it's a wonder that anyone would remain a left-hander, but the number of

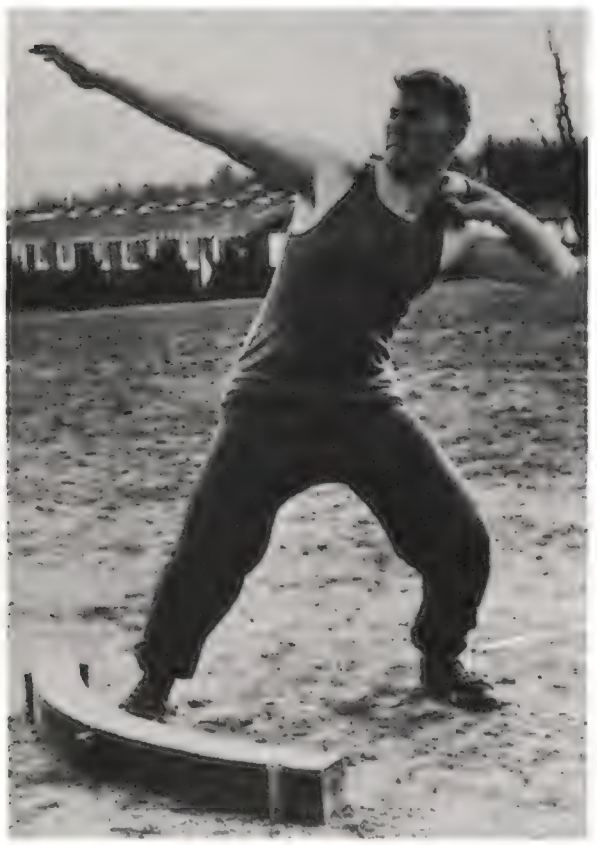
Writing and using ladles are problems southpaws adapt to in individual ways, but in handling chain saws, experts advise using standard, recommended techniques. The unwieldy position shown here is extremely hazardous.

Peter Angelo Simon

left-handers seems to have been consistent through the millennia regardless of social pressures to switch. People have been puzzling for just about as long over why left-handers exist, with great minds from Plato to Rousseau pondering whether handedness was innate or learned. Theories abound. As late as the 1940s, New York psychiatrist Abram Blau blamed left-handedness on toddlers' tantrums. "Sinistrality is . . . nothing more than an expression of infantile negativism and falls into the same category as . . . contrariety in feeding and elimination, retardation in speech, and general perverseness in so far as the infant with meager outlets can express it."

Neurobiologist William H. Calvin suggested that early human mothers carried their babies in their left arms, close to the soothing rhythms of the heart, leaving their right hands free for throwing rocks at rabbits. Genetics appears to be a factor in handedness, but not an overriding one. While about 90 percent of children born to right-handed parents are right-handed, fewer than half of the children of two left-handers grow up to be lefties. Even identical twins may have opposite dominant hands. It may well be that at some point in our evolution, the human neurological system decided that it was more efficient to specialize for performing fine motor skills, be they chucking rocks or penning a sonata. And that specialization is almost always right-handed.

When God divided the sheep and the goats, says the Bible, He consigned the goats to the left, saying, "Depart from me, ye cursed."



In 1951 Norman Schwarzkopf was a lefty shot-putter at his prep school.

All left-handers know that they are different, different in ways that can make everyday life seem like a trip to a foreign country without a phrasebook. Lefties have roughly the first year or two of their lives to prepare for the obstacle course they'll encounter; until they're a couple of years old, infants frequently use both hands interchangeably. It's when children begin to master fine motor skills that a dominant hand emerges.

Most little lefties first run afoul of civilization's rightward bias when they enter school. The first big shock is usually scissors. Why scissors don't work for a left-hander merits explanation. If you pick up an average pair, especially a cheap pair (which grade-school-issue scissors invariably are), you will notice as you open and close them that, in addition to the downward pressure, there is also a little bit of forward pressure in the thumb and a little backward pressure in the fingers. Those pressures push the thumb blade against the finger blade when they cross below the pivot point—which makes them cut.

If you put the same pair of scissors in the left hand, and use the exact same motion with your thumb and fingers, the thumb blade will be pushed away from the finger blade, resulting in the paper simply bending between the slightly separated blades as they cross. To get the scissors to cut, you must push with your fingers and pull with your thumb; it feels awkward, and it is.

For left-handers, scissors are high on the list of problem tools, perhaps because they're encountered at so young an age and because, often, not only the child but also the teacher doesn't understand what the problem is. Staring around the classroom, rubbing a sore thumb to the accompaniment of singing scissors on all sides, the young left-hander may well wonder if

Author Nancy Shute, who lives in Washington, D.C., is proud to call herself a pathological left-hander.

his or her ragged construction-paper tree isn't the result of mere clumsiness.

Many older left-handers remember writing as the biggest hurdle they faced in school. Well into the 20th century, American schools forced pupils to write right-handed through scolding or knuckle-rapping. Left-handed kids paid a price for holding firm; many are the lefties who got demerits in first grade for smudged papers, or who spent backbreaking hours taking high school lecture notes at right-handed desks. Even today, many lefty youngsters report that their parents still have to take them to three or four sports stores before they can find a proper fielder's glove.

In fact, many lefties learn sports right-handed because they're mimicking the movements of their right-handed instructor. John Diana, a Long Island sports nut, spent years searching for left-handed instruction manuals. "I ruined all my wife's golf books," he confesses; every place the instructions said "right" and "left," he glued tiny "left" and "right" labels in their place. He loved bowling; the day he found a book by noted left-handed bowler Earl Anthony, he thought his search for lefty-friendly pictures had ended. He was wrong: the first page stated that although Anthony is a left-handed bowler, the editors had taken it upon themselves to reverse the negatives.

Furniture designer Chris Weiland, a left-hander, teaches woodworking techniques at Indiana University of Pennsylvania. "I show them how to use hand tools right-handed," says Weiland. "Then I change over to my dominant hand. I actually show them both ways." Power tools are a different matter. "You have to learn to use most of them right-handed for safety reasons," he says. "Left-handers seem to be a lot more cautious and perceptive," Weiland adds, speaking of watching his lefty students work right-handed with machines where one false move could mean the loss of a digit. "A left-hander has to overcome and work with a bit more focus."

Stanley Coren coauthored a research paper saying that lefties die earlier.

According to Stanley Coren, the University of British Columbia psychologist who so upset left-handers with his pronouncements on their early demise,

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it's those kinds of adjustments that make life so dangerous for lefties. Lefties are five times more likely to die in accidents than righties, he says, because the world refuses to accommodate them. "The ergonomic and human-factors people say that there aren't enough left-handers out there; they'll just have to learn."

Coren didn't start out aiming to be the Cassandra of the sinistral world. A gregarious, gray-haired 52-year-old, he first became intrigued with laterality while studying perception in the 1970s. Over the years he noticed something odd: although 13 percent of the population of 20-year-olds were left-handed, only 5 percent among 50-year-olds were, and 1 percent of octogenarians. Where were the old left-handers?

In 1988 Coren and Diane Halpern, a psychologist at California State University in San Bernardino, analyzed the life spans of 2,271 baseball players, as recorded in *The Baseball Encyclopedia.* They found that, on average, right-handers live eight months longer than lefties, a small but intriguing difference. But it was their 1991 study, reported in a five-paragraph letter to the *New England Journal of Medicine*, that made Coren and Halpern infamous among left-handers.

They polled relatives of 2,000 people in Southern California who had died recently, asking if the deceased was left-handed. The researchers tabulated a mean age of death for right-handers at 75; for left-handers at 66—a difference of nine years! Left-handedness, it seemed, was a silent killer. "Don't Wait for Lefty," a *New York Times* headline announced, "He's Dead." The researchers' phones rang with entreaties from talk-show schedulers and threats from distraught lefties.

But other researchers say Coren and Halpern's study took too small a snapshot to be reliable; the outcome of statistical studies is strongly influenced by how many people are polled, how the information is gathered, and how much time the study covers. Marcel Salive, an epidemiologist at the National Institute on Aging, ran numbers from a six-year study of elderly Bostonians through the computer and came to the conclusion that death rates were almost the same for lefties and righties. The lack of aged lefties, Salive speculates, may well be due to switching in the earlier part of the century.

"That's the first thing we thought of," Coren counters, noting that the percentage of lefties has proved constant through the centuries, despite cultural pressure to switch. But he admits the nine-year difference may be off base; a more recent British study of mortality among cricket players found a two-year gap, a number Coren says sounds reasonable. Coren and Salive can agree that the question of lefty life span deserves a deeper look.

For their part, lefties say they do have problems with the world, but that those problems are more often niggling aggravations than life-threatening accidents. "We get a lot of complaints about camcorders, hair dryers, telephones—the controls are on the right, and the cord is on the left," says Kim Kipers, editor of *Lefthander Magazine.* "Those are high-ticket, mass-market items. My own pet peeve happens to be notebooks; it's always so darned uncomfortable dragging your hand across the spiral."

Another pet peeve for many lefties is the screw and, by extension, the screwdriver, which turns from left to right. It's harder for a left-hander than for a right-hander to get a screw into the wall. This is because a righty can lean straight into it, getting the power of his body behind him as his elbow comes down with the turn and a 180-degree twist of the forearm. As a lefty turns the screwdriver, the elbow turns up and away from the body, diminishing the power and turning only 90 degrees. It helps to think of the hand as the point

A lefty golfer stands out on the driving range beside a trio of righties. Sportsman John Diana got so fed up with righty instruction manuals that he created one specifically for southpaws.

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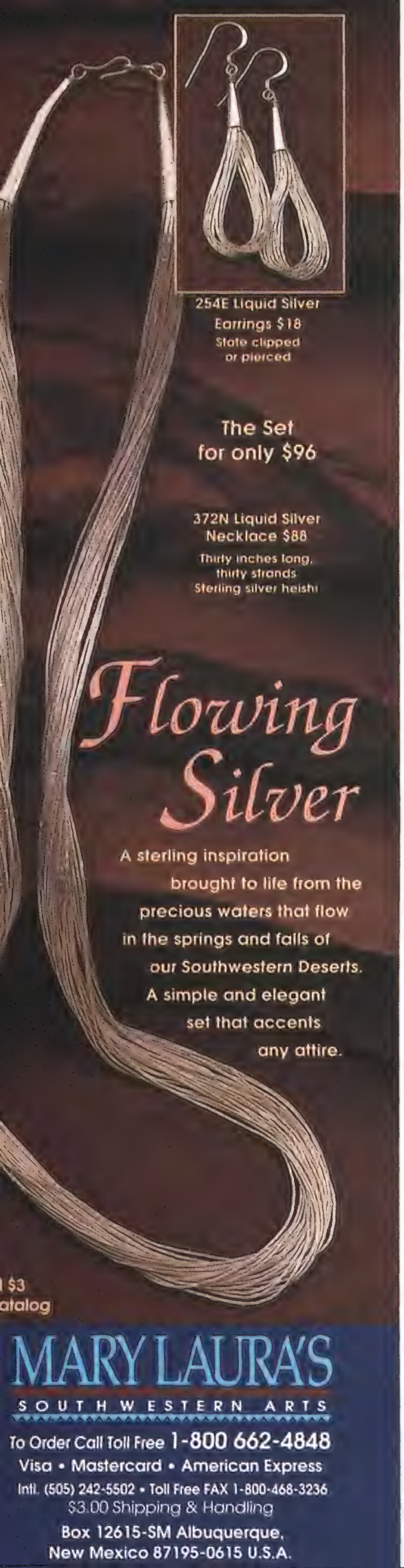

Red Sox southpaw Bill (Spaceman) Lee winds up for a pitch in 1978.

where the whole body becomes an extension of the tool. Of course, it's easier for the lefty to get the screw out. But in which operation do you need the power?

For a lefty, the most mundane tasks can turn dangerous. "The kitchen can be a nightmare for the left-hander," says John Diana. Beyond the usual aggravations—potato peelers, oven mitts, ladles, corkscrews—knives can be downright dangerous because, like scissors, the problem isn't obvious. The one-sided serration of a typical bagel knife carries it slightly to the right as it slices toward the bottom—away from the hand that's holding the bagel. Put that same knife in the left hand, and it will try its best to home in on the tip of the right middle finger.

Even the yard can be treacherous. Gardening writer Allen Lacy, who puts out a newsletter called *Home Ground*, has had run-ins with garden tools worthy of a Stephen King novel. After a few strokes with a sharp-bladed hand weeder, left-handed Lacy realized it might prove more dangerous to him than to the weeds. "The blade curves to the right," he said. "You could eviscerate yourself with no trouble at all."

Add to the list a power lawn mower that threatened to nibble Lacy's toes when he stood on the machine's right-hand side to pull the starting cord (a necessity in order to get the body's strength behind the pull), and a gasoline-powered, nylon-cord trimmer with the exhaust pipe on the right. "I used it for about five minutes and realized it was seriously dangerous. The hot exhaust pipe was right next to my body."

But are these encounters enough to kill left-handers? Calls to the Occupational Safety and Health Administration and a soup of other federal agencies charged with tracking health and safety turned up no evidence of maimed or dying lefties. On the other hand, officials admit that this may be because they never ask if accident victims are left-handed. The major labor unions, from the AFL-CIO to the United Auto Workers, also report no complaints from suffering sinistrals.

Martina Navratilova is one of the lefties who burn up the tennis courts.

Industrial designers say it's not that they haven't noticed lefties. "We make a conscious effort to make tools ambidextrous," says Douglas Spranger, president of Human Factors Industrial Design Inc., a New York City firm that has invented hundreds of specialized hand tools, from surgical staplers to a new mascara wand for Lancôme. "Left-handers are 15 percent of our target market. Every manufacturer is concerned with it." But, Spranger concedes, "We [designers] tend to favor the right-handed user. Notice the numerical keypad on your computer. It's not on the left."

So why aren't lefties incapacitated? "More often than not, left-handers adapt to a right-handed world," Spranger says. "The bottom line is, you left-handed folks have adapted to a much larger range of tasks than we right-handers. We're the functional cripples in this world."

If lefties have learned to adapt, it's also true that the world is lightening up on them. Schoolteachers are more tolerant of left-handed writers, and right-handed desks are becoming a thing of the past. Specialty shops and catalogs hawk left-handed scissors and ladles, garden shears and many other tools. John Diana, the Long Island golfer, dealt with his frustrations by opening a lefty mail-order business that offers high-quality lefty corkscrews and knives, rather than less useful "Left-handers do it right" bumper stickers. He has also written *The Left-Hander's Guide and Reference Manual*, which explains, with illustrations, the left-handed way to golf, bowl, and play tennis and baseball.

But as Coren points out, even if the world banned right-handed tools, left-handers would still face another risk: their own physiology. We've known for more than a hundred years that the human brain is laterally differentiated: the left side usually controls the right side of the body and houses language skills; the right hemisphere usually controls the left side and tends to handle spatial tasks. Nineteenth-century researchers figured that left-handers must be right-brain dominant, the mirror image of a right-hander.

Pernell (Sweet Pea) Whitaker hammers home a straight left in a 1991 fight.

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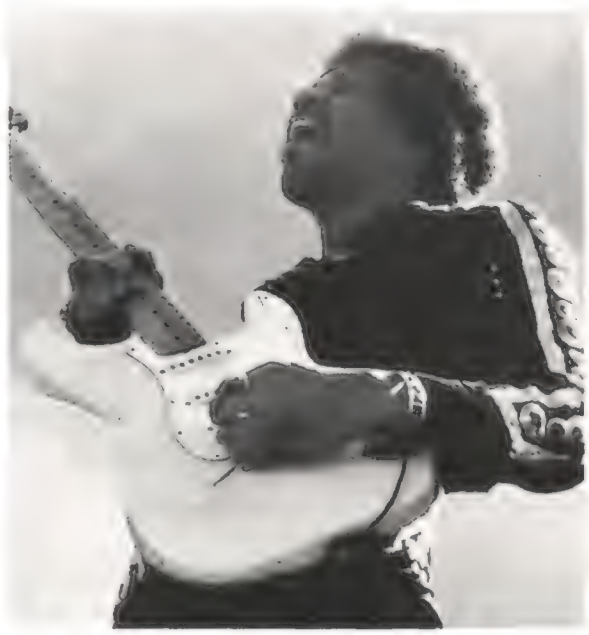
are "right-brained" for language; there's no scientific support for the popular notion that lefties are innately more "right-brained," intuitive and artistic, or that righties are more rigid and rational.

But scientists do know that lefties' brains are different from righties', with less specialization between hemispheres and more crossovers between the two. In recent years, researchers also have documented that non-right-handers suffer a higher incidence of certain health problems, including learning disabilities, migraine, depression, allergies and autoimmune disorders such as rheumatoid arthritis and ulcerative colitis. What they couldn't figure out was why.

One intriguing theory comes from the late Norman Geschwind, an eminent Harvard neurobiologist who, ten years ago, hypothesized that imbalances in testosterone levels during gestation may affect the fetus' immune system and also slow the development of the left brain hemisphere, making it less specialized. That could account for health problems, increased non-right-handedness, and even the fact that men are more often left-handed and suffer more learning disabilities than women.

Some scientists believe that half of all left-handers may be "pathological" left-handers, nudged away from right-



Jimi Hendrix performs in 1970 with a guitar that he has strung upside down.

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Charlie Chaplin, a lefty, applies clown makeup in a scene from *Limelight*.

handedness by hormone levels or stresses such as premature birth. But the realization that your or your child's left-handedness is pathological isn't as awful as it sounds. Coren foresees the day when recognizing left-handers' physiological differences will prompt customized treatments. "It could be helpful," says Mark Hallett, clinical director of the National Institute of Neurological Disorders and Stroke. "Problems like dyslexia sometimes are missed in children. Left-handedness may be a sign that there's a little bit of brain damage. It's always worth looking into." But, he adds, "if the kid's normal, then don't worry."

Fortunately, it's not all bad news for lefties; there are some jobs where sinistrality comes in handy. In no place are lefties considered more precious than in the game of baseball. Sportswriters gave lefty pitchers the sobriquet "southpaw" after the westward-facing pitcher's mound in a Chicago ballpark. The sport favors left-handed pitchers because they face the runner on first base, and left-handed hitters because they stand two steps closer to first.

Still, those small advantages don't account for the large mystique surrounding left-handed ballplayers. Ted Williams, Ty Cobb and "Shoeless Joe" Jackson are remembered not only as great hitters but as great lefty hitters.

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Left-handed pitchers, from former greats like Sandy Koufax and Steve Carlton, perpetrator of a killer slider, to the Seattle Mariners' Randy Johnson, are even more valued, especially for their much vaunted ability to throw to lefty batters. (Among major-league pitchers nearly one-third are lefties.) Johnson throws at about 95 mph; to the lefty hitter, his curveball looks like it's coming straight for the head before it breaks to the right, over the plate. A lot of teams just bench their left-handed hitters when Johnson is pitching. It's not the same when a righty batter faces a righty pitcher; he's more accustomed to facing a righty pitch. Also, insiders say that a lefty's ball is simply more unpredictable.

Many baseball fans also believe that lefty players display a certain endearing flakiness. Former Boston Red Sox

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pitcher Bill (Spaceman) Lee carried that distinction into civilian life by running for President in 1988 and 1992. "You have a left and a right," Lee told *Sports Illustrated.* "The left side controls the right half of your body, and the right side controls the left half. Therefore left-handers are the only people in their right mind."

Lefties also fare well in tennis, boxing and fencing, thanks in large part to the element of surprise; their opponents spend the majority of their playing time fending off the assaults of righties. Rod Laver, Jimmy Connors, Martina Navratilova and John McEnroe are just a few of the many left-handed tennis players who have excelled. But lefties are banned from playing left-handed in polo and jai alai; those sports have deemed a left-handed ambush altogether too dangerous.

It was a draw for the last four Republican Presidents, as lefties George Bush and Gerald Ford joined Richard Nixon and Ronald Reagan at the Nixon Library.

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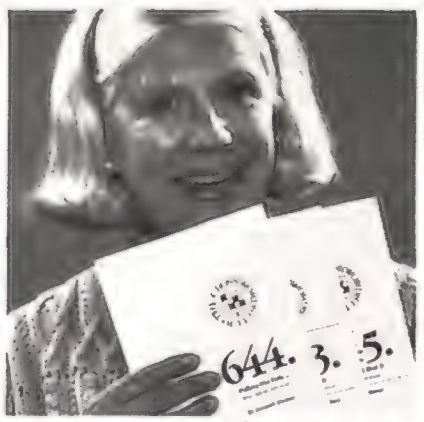

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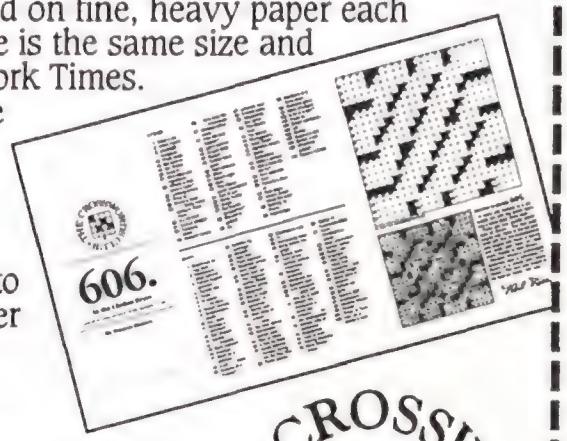

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President Bill Clinton jots down some notes during a 1993 ceremony.

Lefties are also quick to point out that a disproportionately large number of architects, chess masters, mathematicians and artists are left-handed; consider Leonardo, Raphael, Holbein, Klee and Picasso. Musicians Bob Dylan, Ringo Starr and Paul McCartney are lefties. Jimi Hendrix was, too; he strung his guitar upside down. Harpo Marx and Charlie Chaplin were left-handed; Chaplin played a custom-made lefty violin.

And left-handers seem to have growing influence in politics. Presidents Truman, Ford and Bush were all left-handed, as is President Clinton. In 1992, for the first time in history, Americans overwhelmingly voted "left": all of the major Presidential contenders, including H. Ross Perot, were confirmed lefties.

Lefties are becoming increasingly vocal. Lefthanders International, a pro-lefty lobby group, celebrates August 13 as Lefthanders Day. On a recent night, my poker game became an impromptu hotbed of lefty liberation, with four lefties lecturing the one bemused righty on the trials of taking the SAT test at a right-handed desk.

Stanley Coren, for one, is cheered by the lefties' new visibility. He envisions a day when all tools that can't be designed for ambidextrous use are widely available in left- and right-compatible versions. "One of the things I tried to do is to point out that left-handers are

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a minority," Coren said, as we talked in his small, book-crammed office at the University of British Columbia. "They need high-quality tools to conduct their business. They need penknives with a left-sided opening notch." At that, Coren fished a Swiss Army Knife out of his pocket and handed it to me. I reached to open it and—oops! All these years of opening knives and I'd never noticed that I had to reach my left hand across the blade to find the right-handed notch.

It's an experience every lefty can relate to. General Schwarzkopf told me that his mother, a proud ambidexter, insisted that her boy Norman not be switched in school. The U.S. Army was another matter. "When I first came into the military we were still using the old M-1 rifle," the general, now retired, said. "The M-1 was designed for right-handed shooters. All the hot brass was thrown in your face, because it all ejected on the right." The young West Point cadet learned to fire the M-1 right-handed.

But the Army wasn't done with Schwarzkopf yet. "All the holsters were right-handed holsters. If you ever had to use your pistol you were out of luck," he recalled. "Swords were the same thing. You carried the saber on your left side. I had to learn to be a right-handed swordsman."

Like most lefties, however, the general learned to adjust, fighting back only with humor. "For years," laughed Schwarzkopf, "I had a sign on my desk saying: 'Everyone is born left-handed. You turn right-handed when you commit your first sin.' And I believe it!"

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Book Reviews

True North
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As a child living on "Coorain," her family's sheep station, little Jill Ker knew only the schooling of the Australian outback. She played with farm animals and her two brothers, joined in the rough and demanding duties of a 32,000-acre property, never saw another girl child until she was 7, and was 14 before she set foot in a formal school—which she hated. Years later, at the pinnacle of a blazing academic career, she was named president of prestigious Smith College. How in the world did she do it?

True North tells how. This fine book takes over Jill Ker Conway's personal story from where her beautiful and moving childhood memoir, *The Road From Coorain*, ended, with her departure from Australia in search of richer academic pastures. This, then, is the second volume of what her readers hope will be an autobiographical trilogy.

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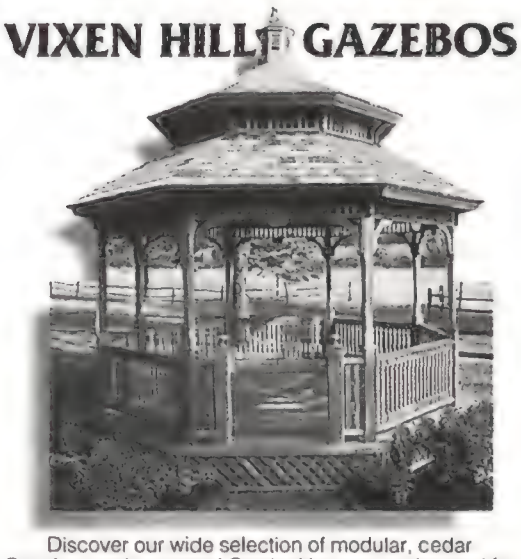

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heat and finally meeting the tragedy of remorseless drought is tough enough to handle Harvard.

So Jill—"product of a small society, tormented by colonial doubts"—storms those ivied walls. She falls in love, first with her courses of graduate study in history, then with John Conway, Canadian war hero and master of one of Harvard's residential houses. After their marriage, the Conways take a year in Europe. She works on her thesis, dealing with the education and growing liberation of American women. John reunes with old friends and contemplates returning to Canada's university life.

In Europe they plot the course of their future. And Jill charmingly and perceptively describes the stops along the way: Oxford in autumn, where she delights in the "exquisite small walled gardens" of Pembroke College, the "pollarded willows turning gold along the banks of the Isis," schoolboys "with scarlet football jerseys and cheeks to match." Then there's Paris in winter, when "a light snowfall . . . etched the Seine's bridges in white." And on to Rome—minus tourists—where, between winter rains, "it was the sunshine I remembered . . . sunlight on handsome Italian faces seated at the cafes along the Via Veneto. . . ." The grand tour ends in Toronto: Jill at the University of Toronto, John at nearby York University. As a historian, the author perceives that Canada's whole nationality still depends on grimly maintaining its differences from the vast and tempting "continental economy" south of the border. The Québecois problem is at this time still only latent.

This life devoted to scholarship comes across as almost too good to be true. That marvelous year of travel; those brilliant dinners with notable intellectuals who are actually close friends; that golden glow of success! Why didn't more of us readers take a stab at academia? One sure answer, made clear in these pages, is that to become a scholar a person must be deeply passionate about scholarship.

However appealing you find Conway's descriptions of cherished European corners, of a weekend with Archibald and Ada MacLeish—"The newest books were on the bedside table. The bell to ring for breakfast was close at hand"—don't merely skim the bits that deal seriously with history and the writing of her thesis. It's love of work that

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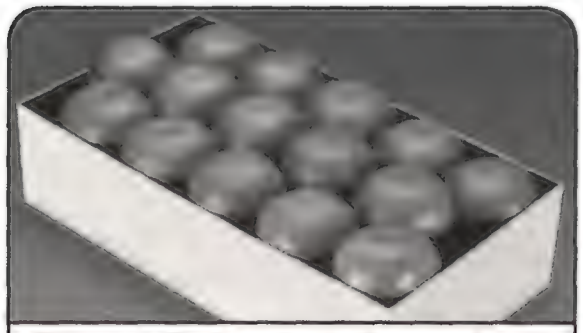

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pays the dues to this exclusive Conway club. And the price is obviously heavy. In this book, John Conway enters the hell of depression, and his wife, so often the ebullient pilgrim on her intellectual progress, battles a host of her own personal demons.

One is her mother. Forced from Coorain by drought, she lives in Sydney, and Jill, visiting her, finds her an even more embittered recluse than when she left for America. Partly because of her, and largely because Australia failed miserably to give her the scholastic chances that she craved, Jill Conway seems pretty well alienated from her native country. That's a pity to me. Being one of Australia's sons-in-law, I love it, even its harsh and often tragic outback. There is an intellectual life to be found there, Mrs. Conway—theater, music, poetry, bursting theories and ideas, and strivings for justice and fair play. And despite its new, hugely cosmopolitan society, the old self-effacing sense of humor has survived.

I shan't convince you, I realize. But never mind. Just get on with the third volume of what you do so very well.
Edwards Park, a Contributing Editor, lives and writes in Annapolis, Maryland.

The Story of Webster's Third
Herbert C. Morton
Cambridge University Press, $29.95

Years ago, working as a bookstore clerk, I learned the merits of different cookbooks. I could field questions about self-help manuals, mysteries, thrillers—even historical romances. But not dictionaries. Dictionaries defeated me. I recall a small but powerful woman hefting a large dictionary in each hand, demanding to know which was better. And why. I was stumped. Today, I know to recommend *Webster's Third New International Dictionary of the English Language, Unabridged.* And for those who want to know why, I would recommend *The Story of Webster's Third.*

Ostensibly, this is an account of the literary firestorm that erupted in 1961 following the publication of a 13½-pound, 2,662-page dictionary, popularly called *Webster's Third.* Herbert Morton has elegantly used the harsh reaction to this dictionary to frame a larger story for his readers: the fascinating account of how dictionaries have evolved over the past 300 years and how Philip Gove, who edited *Webster's Third*, put his controversial book together. Morton's

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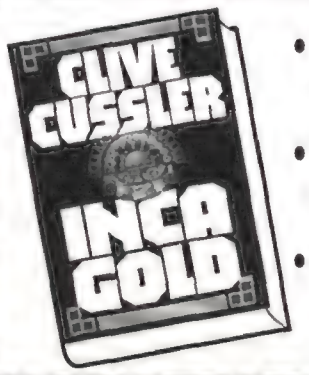

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lively tale makes it clear that Gove's dictionary was wrongly condemned by an astonishing number of America's leading critics and writers.

Webster's Third is a direct descendant of Noah Webster's first great American dictionary, published in 1828. Unlike Samuel Johnson, the great English lexicographer of the previous age who saw his dictionary as a tool to slow the change in language, Webster intuitively understood that language itself was a tool that must evolve to suit the people who used it. Thus Webster proudly introduced new words and new meanings that had arisen in 19th-century America: the nouns *fracas* and *malpractice*; the adjectives *dyspeptic* and *retaliatory*; the verbs *electioneer* and *revolutionize*. (He coined the word *jeopardize*.)

After Webster's death, printers and booksellers George and Charles Merriam bought the rights to his dictionary. In 1847 they published a single-volume edition of the dictionary and sold it for $6, less than half the price of the original. The price cut outraged Webster's heirs, but their anger subsided when sales (and their royalties) quickly took off. Over the years, a number of new dictionaries challenged the Merriam-Webster dictionary but none had long-term success. Even the loss of the exclusive right to the Webster name in 1889 (the result of the Merriam Company's failure to protect its trademark), which led to a host of Webster pretenders, hardly slowed the growth of the company. The Merriam Company remained successful because it continually expanded and updated its flagship dictionary, *Webster's International Dictionary* (1890), with 175,000 entries; that volume gave way to *Webster's New International* (1909), with 350,000 entries, which in turn gave way to *Webster's Second New International* (1934), with more than 600,000 entries.

In 1951 lexicographer Philip Gove was selected to oversee the creation of *Webster's Third*. To make room for tens of thousands of new words that had entered the language, Gove had to trim the word list in *Webster's Second* (at 3,400 pages, it had reached the limits of the single-volume format). Out went the nonlexical material: the gazetteer and biographical appendices, many foreign terms, given names, book titles, the names of the saints and biblical characters, rivers and lakes, stars and comets, battles and treaties, and the like. (Gove felt that a dictionary should not pretend to be an encyclopedia.)

Gove was a taciturn Yankee, an aloof and sometimes coldly efficient manager who communicated with the large staff of definers, etymologists, and pronunciation and usage specialists through a series of memos that became a detailed book of rules governing the making of *Webster's Third*. His aim as a lexicographer mirrored Noah Webster's: to produce a dictionary that accurately described the existing language. Like most lexicographers, he rejected as unworkable the notion that a dictionary should attempt to prescribe proper English. But in his preface to *Webster's Third* he failed to explain why a dictionary must remain descriptive, and he made little effort to justify some of the more controversial changes (his decision to cut back on the use of the "slang" label, for example). Critics, in turn, paid less attention to Gove's book than to the Merriam Company's press release

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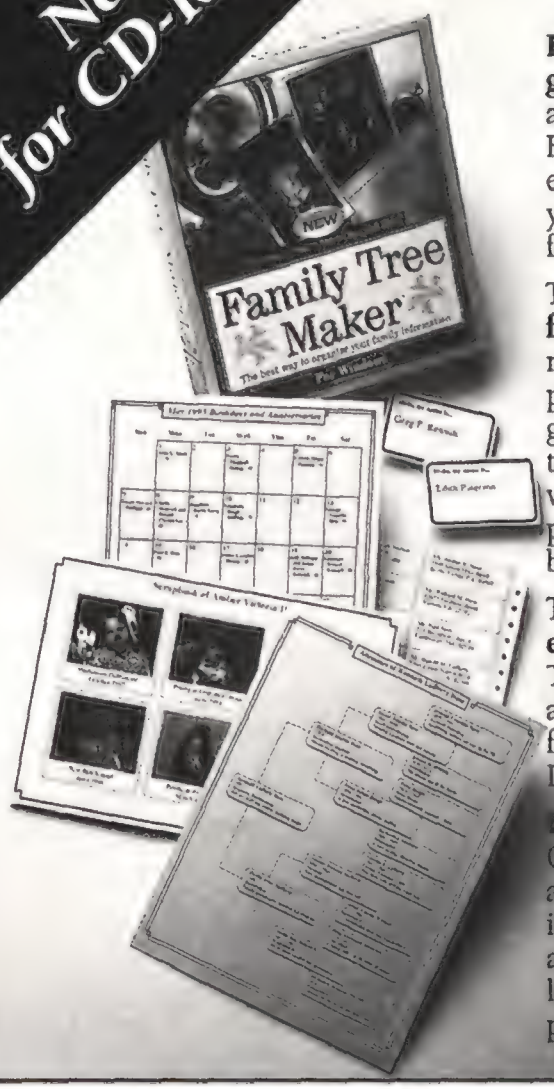

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touting the "revolutionary" changes in the dictionary. The backlash was swift and furious.

The *New York Times* mocked the new edition ("A passel of double-domes . . . have been confabbing and yakking for twenty seven years. . . .") and urged the publishers to scrap it and start over. The *Washington Post* advised readers to "hang on to" *Webster's Second* ("hang on to" in this sense does not appear in *Webster's Second*). *Time* denounced *Webster's Third* as the "most radical version yet of the nation's most famous dictionary." *Life* accused the dictionary of "joining the say-as-you-go school of permissive English." The *New Yorker* agreed. The *Atlantic* pronounced it "a scandal and a disaster." British publications, on the other hand, widely praised the book.

Today few would challenge the claim that *Webster's Third*, which has sold some 2.5 million copies, is the preeminent single-volume dictionary of the English language. As one scholar wrote in 1989, assessing the dictionary after almost three decades, "*Webster's Third* . . . attempted to apply the best standards of mid-twentieth century linguists to dictionary making. . . . No dictionary presents a fuller or more reliable picture of the American vocabulary at mid-century. . . . [It] remains the greatest dictionary of current American English."

The American critics were plainly wrong. Still, I finished *The Story of Webster's Third* with the disquieting sense that, persuasive as the book is, a new edition of *Webster's* probably will restart the same war of words. Critics of *Webster's Third*, and those who expect an unabridged dictionary to prescribe proper language and usage, would do well to read this illuminating book. It is must reading for anyone who cares about words and how they are used.

Karl Ackerman is the author of the novel *The Patron Saint of Unmarried Women*, published by St. Martin's Press.

Shadowbirds
William Burt
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"What is it about rails?" William Burt anticipates the question. "They would seem deliberately designed to be displeasing, these dull-colored, songless birds that live in inconvenient places. . . . It is the elusiveness, the inaccessibility, that fascinates."

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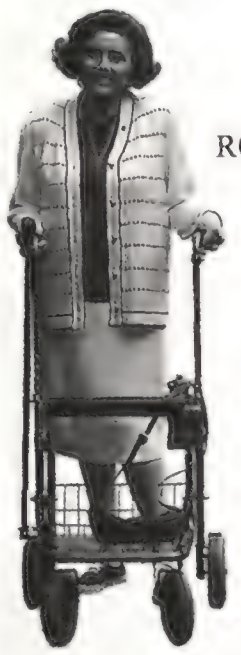

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equipment into marshes of Maryland, Minnesota, North Dakota and Manitoba. He is after the birds' photographs, and following months and years of daunting effort he at last gets them—beautifully.

To that end, Burt employs an otherworldly and ingenious rig of his invention. "The arrangement," he explains, "includes camera and autowinder and tele-macro lens and two heavy, potent flash units, main and fill, and big square diffusing screens to soften them; and a single microswitch to fire it all, and a flashlight to see and focus by, all assembled together upon a frame with struts and shoulder brace to make a single, solid, portable 'studio.'"

Beyond delivering a largely anecdotal dissertation on the rail—a wealth I leave to the reader to peruse—Burt paints vivid portraits of the marshes themselves. Of Connecticut's Dead Man's Swamp, Burt writes: "You either keep moving or sink, and to keep moving in this jungle lushness requires the sort of exertion that on a hot, humid day might kill you. Add insects to the regime, and the misery is thorough."

In contrast, Burt cites the "aromatic tracts of fine, soft *Spartina patens*, yellow-green grass of the salt meadow, like those at Elliott Island, Maryland. Solid and peaty, merely damp, these are easy to wander as a golf course, or the village green."

After hours and days in the relative wilderness of such wetlands, human encounters gain immense proportion. Emerging at night from a marsh in Manitoba, Burt ambles down a quiet highway, drunk with natural rapture. Soon he hears "a new sound, more ominous; the baritone of a decelerating V-8, which rumbles past and stops. . . . It is as if a switch were flipped: at once the gleaming heavens recede and dim and I alert galvanically, with a good strong jolt of caution. I don't trust my human fellows—these fellows at least." There follows an uncomfortable exchange, which concludes with the offending vehicle "fishtailing absurdly" away into the darkness.

Sarcastic or suspicious "automotive yahoos" are the exception. But even in the community of birders there is tension. In pursuit of a species that is infamously difficult to see, competition for the same bird can give long-enduring tempers rise. At other times, shared labor generates fraternity. On one such evening, Burt joins two strangers in a Maryland marsh. Lured by the recording of a black rail's call—a mechanical *de-de-drr*—a live rail finally surrenders to its territorial ire. The bird "emerges, transfigured, upon the surface of the grass; he stands immobile for the moment, elegant, sparrow-tiny and proud, magnificent with neck outstretched and red eyes blazing in our lights."

And then, suddenly, the bird is gone. "There is handshaking and jubilation," Burt writes, "as we make our way back to the road."

Admirably, *Shadowbirds* is in spirit a defense of wonder in the natural sciences. Burt decries his prep school biology class—"a program of rote and inculcation so oppressive, so dull, so lacking in life and oxygen that it ought to have extinguished permanently any young boy's flicker of a love for nature," and invokes Thoreau: "The man of science who is not seeking for expression but for a fact to be expressed mere-

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ly, studies nature as a dead language."

Burt draws inspiration from two bygone birders: Judge John N. Clark, who spent much of his time in the late 1800s seeking black rails and their nests in marshes along the Connecticut River, and the Rev. P. B. Peabody, who in the early part of this century established himself, with notable eloquence, as the authority on yellow rails and their nesting habits. Among Mr. Peabody's notebooks, Burt finds a 45-page index to a work entitled *Nesting Ways of North American Birds.* There is also an endword to the same work, a single page, signed by hand. The page is numbered 5,890. "But where in the world," Burt demands, "are the 5,889 other pages that precede it? The manuscript itself is nowhere to be found."

"Mr. Peabody was, above all else, enthusiastic," Burt writes in a description that as easily befits himself; ". . . it is the irrepressible grown-up boy you see romping around exploring, inquiring, exclaiming."

The immense, filial fondness Burt reveals for Peabody is touching but somehow unsurprising, as it is in any inherited craft, where kinship is nourished with the dead at least as much as with the living.

Despite the warmth, this zeal which so charms, one cannot avoid taking *Shadowbirds* to task on grounds of style. With some regret—for harsh criticism is unpleasant even if deserved, and too-florid prose may please some readers as poetic—I confess to finding *Shadowbirds* largely overwritten, often to the point of discomfort. The writer must think and feel more elaborately, more precisely, than we. But he absolutely must not *swoon.* In an understandable attempt to infuse his work with eloquence and vigor, Burt has rendered mawkish many passages of feeling and description that if controlled, could have carried significantly greater power. As it is, the book must succeed with little assistance from its style.

And so it does. For one requires neither flawless prose nor great love of rails to admire Burt's determination, to appreciate his reverence for the natural world focused into passion for rail and marsh, to share part of his excitement, his awe, at each sighting of the objects of his quest. Burt's greatest reward, perhaps, comes after years of searching, when he stumbles on the rarest jewel of raildom—never to be found by many

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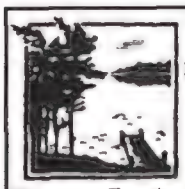

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who are equally devoted—a black rail's nest, beneath a canopy of grass on Elliott Island in Maryland.

"What is it like to find the Holy Grail?" Burt writes of his discovery, gazing at the clutch of speckled eggs. "It is unpeaceful and uncertain."

Andrew Todhunter is a freelance writer based in Sebastopol, California.

Sapelo's People
William S. McFeely
Norton, $18.95

Sapelo Island, a remote and thinly inhabited stretch of marsh, dune and lowlying woods off the coast of Georgia, midway between Savannah and Jacksonville, has a particular appeal for two species of contemporary predators—social scientists and real estate developers. To sociologists and cultural anthropologists, Sapelo is a sociocultural laboratory where isolation effectively preserved the language and customs of its African-American residents, who can trace their lineage directly back to slavery and even to Africa. Developers, meanwhile, want to bulldoze the past and sell getaway homes on easy terms.

Cornelia Bailey, the current matriarch of Sapelo and "keeper of the kingdom," in William McFeely's phrase, has a wary and resigned response to these and other outsiders who intrude on the island's privacy: "Take a number and get in line." McFeely, a Pulitzer Prize-winning historian from the University of Georgia, had to justify his own intrusion on Sapelo, if only to himself, when he set out on the series of visits and ruminations that resulted in the writing of *Sapelo's People.*

He came as a historian, he concluded, wanting to share knowledge as well as gather it. And he came as a respectful, nonpatronizing friend to today's island dwellers, with a desire "to pay honorable attention." It's not a bad phrase, and a perfect reflection of McFeely's approach. This is a gentle, deferential intruder whose mission—what he calls "a meditation on race"—seems to come clear to himself only gradually.

McFeely patches together the history from books and archives and long memories. The Spaldings, the planter family that imported hundreds of slaves to work their cotton fields, dominated Sapelo until the Civil War. Thomas Spalding, who bought slaves for $100 a head at the Charleston slave market, encouraged his chattels to live in fami-

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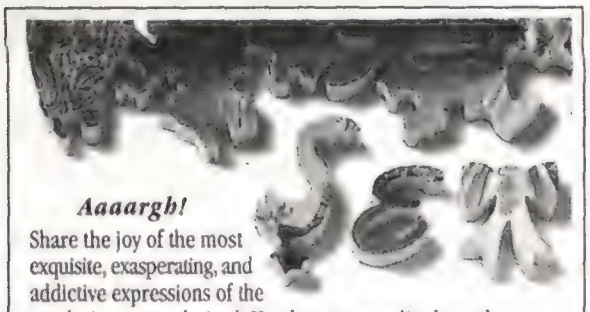

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lies—the better to produce more slaves. McFeely turns up a remarkable early slave named Bilali, an Africa-born Muslim who could read and write, wore a fez and became manager of Spalding's holdings. Bilali even wrote a book about his life, in Arabic.

When the Civil War began, most of the Sapelo slaves were ferried across the channel to the mainland and then marched 200 miles inland to work on other plantations. A few stayed behind, and a few others escaped to join the Union Army. In the head-spinning days immediately after the capture of Savannah, the free blacks were given land grants on orders from Gen. William Tecumseh Sherman, whose army they had followed on its march to the sea. They began working their own land, proudly establishing their own schools and churches.

But all too soon the Spaldings returned to Sapelo, regaining possession of their land on the island with the help of government agents appointed by President Andrew Johnson, anxious to placate the ex-Confederates. The descendants of Bilali became sharecroppers barely better off than their fathers. A brush with education had given them a hope that flickered but briefly. "The flash of faith in 1865," McFeely writes, "that somehow schooling—achieving the word—would carry [them] into a freedom that had true meaning lost its fire."

In time the cotton crops failed, and the last Spalding departed the island, replaced by Northern entrepreneurs with grand schemes for timber growing, oystering and resorts. But these too faded, and Sapelo returned to its true owners, the people whose ancestors lay in the little cemetery called Behavior.

McFeely is no crusader. Racial oppression in a half-dozen different forms is depicted in his meditation, but presented more in sorrow than in anger. When he writes without explanation that the blacks on Sapelo were really disenfranchised in 1906—presumably by literacy requirements—his point is more powerful for its very mildness. And when he does erupt in uncharacteristic anger, it comes like a sudden explosion. Staring at his own hands next to those of an elderly basket maker named Allen Green as they share a porch swing, he is abruptly struck by the sheer imbecility of judgments based on skin color: "What in hell has the blue chestnut-brown of Green's hand and

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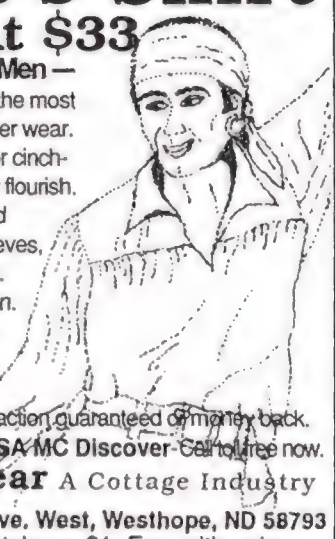

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the mottled off-white of mine to do with all the idiotic hatred that has plagued the whole of our land—and the immediate land of Hog Hammock—for the last two or three hundred years?"

Sapelo's story "gives the lie," he writes, "to any facile tale of the brotherhood of man. It demands that we get past the blindness of thinking that, after all, there is no difference caused by poverty, race, and a history of enslavement on one hand and by the smug self-satisfaction of privileged observers of these phenomena on the other." His ultimate purpose is to bridge that chasm, "to begin a reconciliation, to enter into acts of comprehension and connection." The spirit of this gentle, diffident and compassionate book is not a bad way in which to advance on that daunting and often discouraging goal, and in the end it more than justifies the intrusion that made it possible.

Donald Dale Jackson writes from his home in rural Connecticut.

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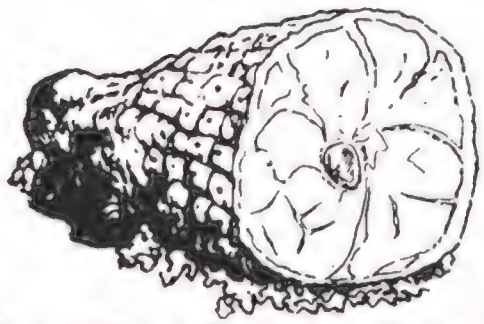

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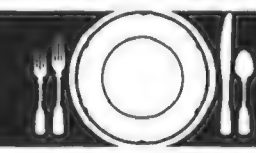
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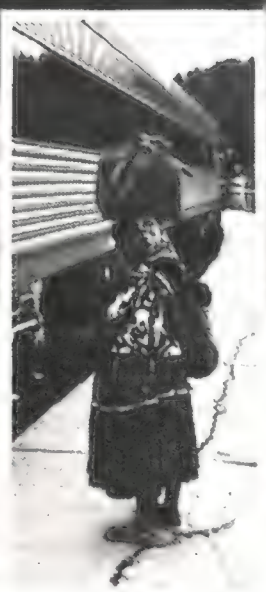

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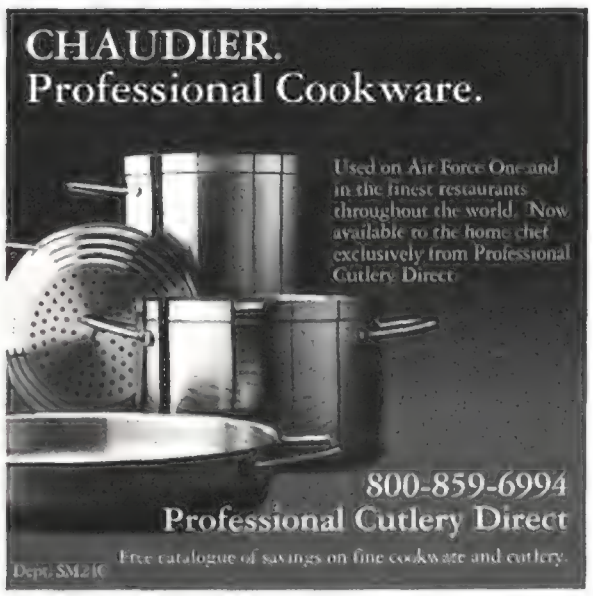
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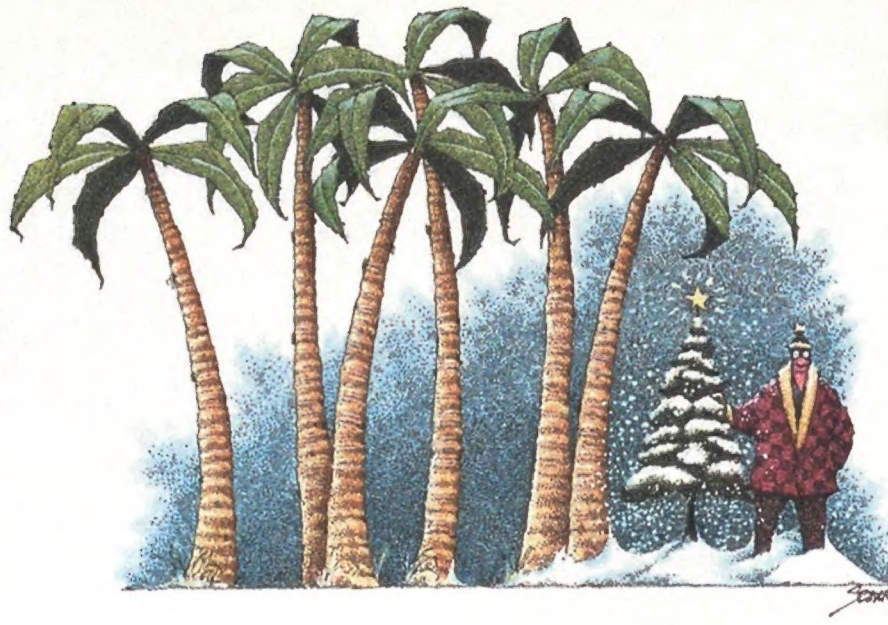
By Robb White

What's Christmas down South without snow, a tree and a few rats?



Back when I was too young to know any better, I gave way to one of my compulsions and bought a semi truck. I would rather have had a railroad locomotive, but I didn't want to be subsidized by the government. I quickly found out that I could barely make the payments on the thing if I drove it all the time and spent a night at home in Georgia about once a month.

In those days, the only legal freight independent truckers could haul was produce. All other freight was "regulated," which meant the big companies had gone through the necessary rigamarole with the officials and the unions to have the "right" to transport everything that wasn't perishable. I guess they left the fruits and vegetables for us because too much rigamarole in a truck makes tomatoes liquefy and strawberries grow beards.

So I used to drive North with a refrigerated trailer full of possible disaster and then deadhead back for another load. ("Deadhead" is an old railroad name for an empty car.) Only on special occasions could I find a legal load to bring back South, and it was generally a rip-off instead of a bonus, but I took it anyway if I could.

Late one December, while I was unloading tomatoes in Chicago (a whole semi load . . . in boxes . . . by hand), a fella told me about a legal back load of Christmas trees in the Upper Peninsula of Michigan, so I took off to maybe make a little loose change for the season. The farther I drove, the more it snowed. By the time I got to the place, it was a regular blizzard. Boys with snowmobiles were tearing around dragging big bundles of trees in snow so thick I didn't know how they could see where they were going. They loaded my trailer in snow that was driving so hard the whole interior got drifted in solid around the bundles. Then they plowed me out to the highway, and I set off to deliver all those trees to about ten Winn-Dixie stores down around Tampa and St. Petersburg.

I got to St. Pete late on the night before Christmas. I was tired and dirty. Winn-Dixie had canceled, and I was stuck with the trees. That meant I was going to have to hole up in my sleeper until after Christmas, when I could get an advance on another load and buy enough fuel to get home.

I decided to spend the few little nickels and dimes I had left on something to eat. While I was doing that, I struck up a conversation with this retired Yankee lady in flip-flops, a muumuu and a flowery hat. We started out talking about generic products after I bummed one of her "Cigarette"-brand coffin nails. She told me that "Detergent" was all right but "Perfume" was too stinky to suit her. I told her that we had a "Whisky" when I was young that was the same way. She said her father had told her that that kind of whisky would kill you. I said it might have been the very thing that eventually did kill my father.

She said that she wasn't about to let any of it kill her—not just yet, at any rate. I said that I wouldn't mind if some of it were to maim me in the sleeper of my truck pretty soon. She laughed and said the only thing she wanted right now was to see some snow. I told her to give me another one of those "Cigarettes" and to come with me.

Four people followed us out of the coffeeshop. I related my tale of woe on the way to where the truck was idling out there in the balmy Florida night. One little man (he told me later that he had invented the type of springs used in all the car seats in the whole world) said that he had given up on Christmas trees after his wife died, but that he would really like to have one this year. I told him that I was in a position to fix him up.

When I opened the trailer doors, about a cubic yard of snow fell out onto the parking lot. Before I could cut the string and get the man's tree out of the bundle, there were five or six more people messing around in the snow. When I rapped the stump on the pavement to shake the frozen limbs loose, the snow sparkled to the asphalt under the mercury vapor lights, and people either reached for their money or headed for a phone to call their friends.

Well, it turned into a Christmas-tree sale that must have had Mr. Winn and Mr. Dixie doing flips in their graves. I sold all the trees in my truck in what seemed like only a minute or two. Not only that, but my friend the inventor threw a snowball at one of his wizened cronies and that escalated into a huge snowball fight.

People stuffed trees into the backseats of their cars and money into my pockets and down my shirt. More than one of them had a pint in their pocket, but I declined because I knew I still had a long haul home. Me and all that money.

After a while, everybody left and I was by myself there in the wet parking lot with the rats. A bunch of them had been hiding in the bundles of trees, hibernating or something. They looked like regular old garden-variety rats, the kind you find all over the country. I wondered what they thought when they woke up in St. Pete. They had seemed sort of confused as they waddled out of that Michigan snow through the frolic and into their new home in the flower beds of Florida.

I found myself murmuring, as I drove out of sight, "Merry Christmas, rats. Don't eat any of those oleanders."

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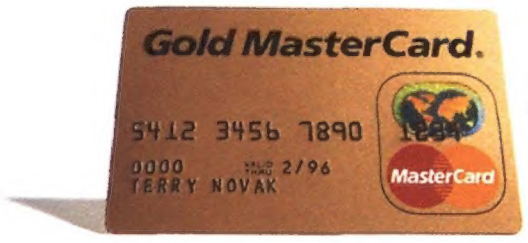

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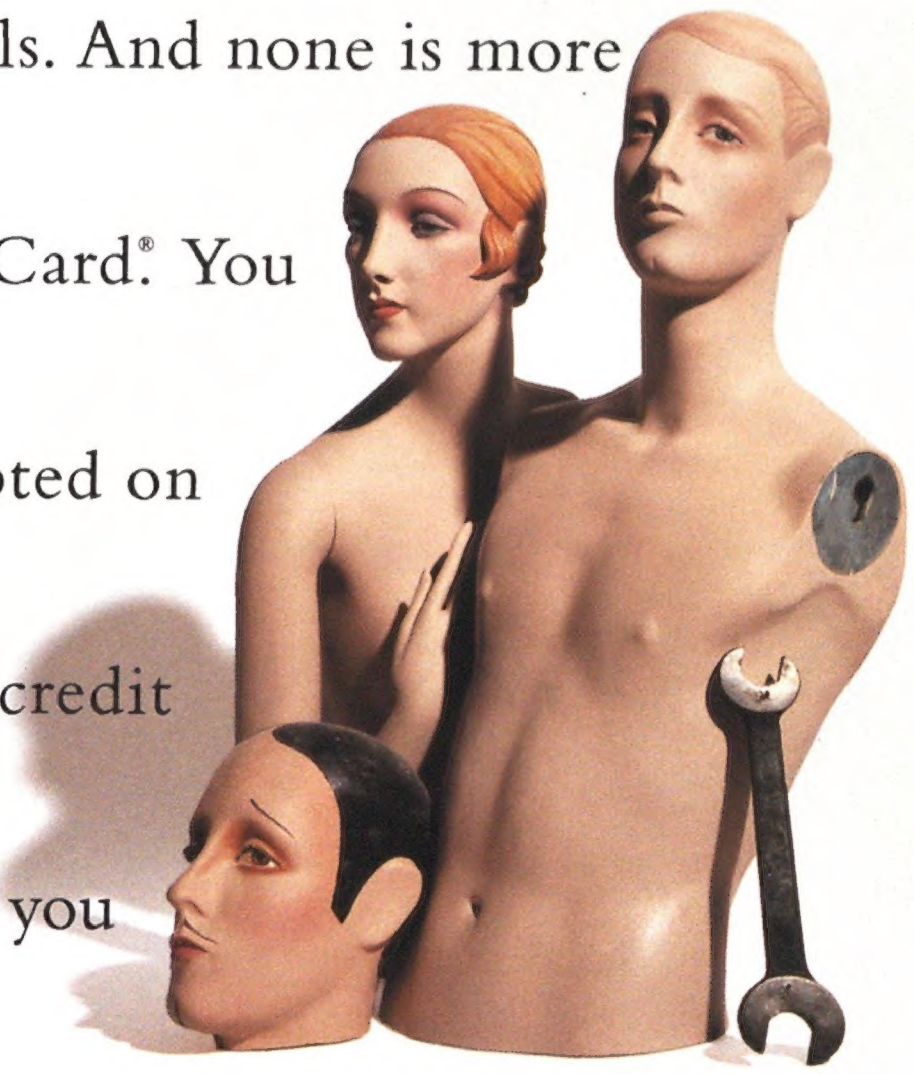

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